SAF-RC-020 100-BC Burial Grounds – Soil Full Protocol FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02

MIP 03/27/06

COMMENTS:

SDG K0197

SAF-RC-020

Waste Site: 100-B-20



Date:

16 March 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-20

Subject: Semivolatile - Data Package No. K0197-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0197 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample IQ	Sample Date	Media	∵ Validation	Date
J10V70	1/19/06	Soil	С	See note 1
J10V71	1/19/06	Soil	С	See note 1
J10V72	1/19/06	Soil	С	See note 1
J10V73	1/19/06	Soil	С	See note 1
J11108	1/19/06	Soil	С	See note 1

^{1 -} Semivolatiles by 8270C.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two

times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

Method Blanks

 (3°)

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, all bis(2-ethylhexyl)phthalate results were qualified as undetected, raised to the RQL and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the

spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike (57%) and matrix spike duplicate (54%) recoveries outside QC limits, all isophorone results were qualified as estimates and flagged "J".

Due to matrix spike (42%) and matrix spike duplicate (39%) recoveries outside QC limits, all 2-nitrophenol results were qualified as estimates and flagged "J".

Due to matrix spike (48%) and matrix spike duplicate (44%) recoveries outside QC limits, all 2,4-dimethylphenol results were qualified as estimates and flagged "J".

Due to matrix spike (55%) and matrix spike duplicate (51%) recoveries outside QC limits, all 1,2,4-trichlorobenzene results were qualified as estimates and flagged "J".

Due to matrix spike (50%) and matrix spike duplicate (52%) recoveries outside QC limits, all 2-methylnaphthalene results were qualified as estimates and flagged "J".

Due to matrix spike (12%) and matrix spike duplicate (16%) recoveries outside QC limits, all 2,4-dinitrophenol results were qualified as estimates and flagged "J".

Due to matrix spike (21%) and matrix spike duplicate (22%) recoveries outside QC limits, all 4,6-dinitro-2-methylphenol results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate (57%) recovery outside QC limits, all 4-chloro-3-methylphenol results were qualified as estimates and flagged "J".

Due to LCS recoveries outside QC limits, all isophorone (57%), 2,4-dimethylphenol (41%), 1,2,4-trichlorobenzene (57%), 4-chloro-3-methylphenol (58%) and 2-methylnaphthalene (58%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample

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results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

· Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J10V70/J10V71) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Forty analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

Completeness

Data package No. K0197-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, all bis(2-ethylhexyl)phthalate results were qualified as undetected, raised to the RQL and flagged "U".
- Due to matrix spike (57%) and matrix spike duplicate (54%) recoveries outside
 QC limits, all isophorone results were qualified as estimates and flagged "J".
- Due to matrix spike (42%) and matrix spike duplicate (39%) recoveries outside
 QC limits, all 2-nitrophenol results were qualified as estimates and flagged "J".
- Due to matrix spike (48%) and matrix spike duplicate (44%) recoveries outside QC limits, all 2,4-dimethylphenol results were qualified as estimates and flagged "J".
- Due to matrix spike (55%) and matrix spike duplicate (51%) recoveries outside QC limits, all 1,2,4-trichlorobenzene results were qualified as estimates and flagged "J".
- Due to matrix spike (50%) and matrix spike duplicate (52%) recoveries outside QC limits, all 2-methylnaphthalene results were qualified as estimates and flagged "J".
- Due to matrix spike (12%) and matrix spike duplicate (16%) recoveries outside QC limits, all 2,4-dinitrophenol results were qualified as estimates and flagged "J".
- Due to matrix spike (21%) and matrix spike duplicate (22%) recoveries outside QC limits, all 4,6-dinitro-2-methylphenol results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate (57%) recovery outside QC limits, all 4-chloro-3-methylphenol results were qualified as estimates and flagged "J".
- Due to LCS recoveries outside QC limits, all isophorone (57%), 2,4-dimethylphenol (41%), 1,2,4-trichlorobenzene (57%), 4-chloro-3-methylphenol (58%) and 2-methylnaphthalene (58%) results were qualified as estimates and flagged "J".

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Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Forty analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

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Appendix 2
Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG K0197	AREVUEVVERY TEN	#Projects: 1100-B±20	'RAGE_11_0F11_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Bis(2-ethylhexyl)phthalate	U at RQL	All	Blank contamination
Isopherone 2-nitrophenol 2,4-dimethylphenol 1,2,4-trichlorobenzene 2-methylnapthtalene 2,4-dinitrophenol 4,6-dinitro-2-methylphenol	J	All	MS/MSD recovery
4-chloro-3-methylphenol	J	All	MSD recovery
Isophorone 2,4-dimethylphenol 1,2,4-trichlorobenzene 4-chloro-3-methylphenol 2-methylnaphthalene	J	All	LCS recovery

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: WASHINGTON CLOSUR											
Laboratory: LLI	SDG:	K0197									
Sample Number		J10V70		J10V71		J10V72		J10V73		J11108	
Remarks				Duplicate							
Sample Date		1/19/06		1/19/06		1/19/06		1/19/06		1/19/06	
Extraction Date		1/26/06		1/26/06		1/26/06		1/26/06		1/26/06	
Analysis Date		1/29/06		1/29/06		1/29/06		1/29/06		1/29/06	
Semivolatile (8270C)	RQL	Result	Q		Q	Result	Q	Result	Q	Result	Q
Phenol	660	360	U	360	_	360	_	380	U	380	_
bis(2-Chloroethyl)ether	660	360	_	360		360		380		380	
2-Chlorophenol	660	360	U	360	U	360		380	Ų	380	U
1,3-Dichlorobenzene	660	360	υ	360	U	360		380	_	380	U
1,4-Dichlorobenzene	660		J	360	U	360		380		380	U
1,2-Dichlorobenzene	660	360		360		360		380		380	
2-Methylphenol	660	360	_	360		360	D,	380		380	
2,2'-oxybis(1-chloropropane)	660	360		360		360		380		380	
3 and/or 4-Methylphenol	660	360	ט	360	υ	360	U	380	บ	380	
N-Nitroso-di-n-propylamine	660	360	حا	360		360	_	380		380	
Hexachloroethane	660	360	_	360		360		380		380	
Nitrobenzene	660	360	ב	360	U	360		380	υ	380	
Isophorone	660	360	3	360		360	ហ	380	UJ	380	
2-Nitrophenol	660	360	IJ	360	UJ	360	S	380	3	380	IJ
2,4-Dimethylphenol	660	360		360		360		380		380	
bis(2-Chloroethoxy)methane	660	360	_	360		360		380	U		
2,4-Dichlorophenol	660	360		360	_	360			_	380	
1,2,4-Trichlorobenzene	660	360		360	_	360			UJ	380	_
Naphthalene	660	360		360		360		380		380	
4-Chloroaniline	660		υ	360		360			U	380	
Hexachlorobutadiene	660		Ų	360			Ü	380	υ	380	
4-Chloro-3-methylphenol	660		UJ	360			ŲJ	380	IJ		UJ
2-Methylnaphthalene	660	360	IJ	360		360				380	UJ
Hexachlorocyclopentadiene	660		u	360			υ	380	Ü	380	υ
2,4,6-Trichlorophenol	660	360	_	360	, –	360		380	_		U
2,4,5-Trichlorophenol*	660			900			<u>U</u>	_ ::-	Ü		_
2-Chloronaphthalene	660	360	_	360	_		U	380	U .		
2-Nitroaniline*	660	910		900		910			د	940	
Dimethylphthalate	660	360	U	360	U	360	U	380	U	380	
Acenaphthylene	660	360	_	360	U	360		380	U	380	
2,6-Dinitrotoluene	660	360	U	360	U	360	U	380	U	380	Ų

	Project: WASHINGTON CLOSUR	E HANF	ORD		}							
	Laboratory: LLI	SDG:	K0197									
	Sample Number		J10V70		J10√71		J10V72		J10V73		J11108	
	Remarks				Duplicate							
	Sample Date		1/19/06		1/19/06		1/19/06		1/19/06	_	1/19/06	
	Extraction Date		1/26/06		1/26/06		1/26/06		1/26/06		1/26/06	
	Analysis Date		1/29/06		1/29/06		1/29/06		1/29/06		1/29/06	
	Semivolatile (8270C)	RQL		Q_	Result	Q		Q	Result C		Result	Q
	3-Nitroaniline*	660	910	U	900		910		940 U		940	
	Acenaphthene	660	360	U_	360	_	360		380 U		380	
	2,4-Dinitrophenol*	660			900	_	910		940 U		940	
	4-Nitrophenol*	660	910		900		910	_	940 U		940	
	Dibenzofuran	660			360		360		380 U		380	
	2,4-Dinitrotoluene	660			360		360	_	380 U		380	
	Diethylphthalate	660			360		360	_	380 U		380	
	4-Chlorophenyl-phenyl ether	660	360		360		360		380 U		380	
	Fluorene	660			360		360		380 U	_	380	
	4-Nitroaniline*	660	910		900		910		940 U	_	940	
	4,6-Dinitro-2-methylphenoi*	660			900		910		940 U		940	
	N-Nitrosodiphenylamine	660			360		360		380 U		380	
_	4-Bromophenyl-phenyl ether	660			360		360		380 U		380	_
9	Hexachlorobenzene	660			360		360		380 U		380	
000013	Pentachlorophenol*	660			900		910		940 L		940	
9	Phenanthrene	660			360		360		380 U		380	
9	Anthracene	660			360	_	360		380 U	_	380	_
-	Carbazole	660			360		360		380 U		380	
ω	Di-n-butylphthalate	660			360	U_	360		380 U		150	
	Fluoranthene	660			43	⊢-	360		380 U		380	
	Pyrene	660			40		360		380 U		380	
	Butylbenzylphthalate	660			360		360		380 U		380	_
	3,3'-Dichlorobenzidine	660			360	_	360		380 L		380	
	Benzo(a)anthracene	660			29		360		380 U	_	380	
	Chrysene	660			31	ļ	360		380 L		380 660	
	bis(2-Ethylhexyl)phthalate	660			660		660					
	Di-n-octylphthalate	660			360		360		380 L		380	
	Benzo(b)fluoranthene	660			35		360		380 U		380	
	Benzo(k)fluoranthene	660			35	_	360		380 L		380	_
	Benzo(a)pyrene	660			32	<u> </u>	360	Ų.	380 L		380	
	Indeno(1,2,3-cd)pyrene	660			21	<u> </u>	360		380 L		380	
	Dibenz(a,h)anthracene	660			360		360		380 L		380	
	Benzo(g,h,i)perylene	660	360	ĮU	23	ــــــــــــــــــــــــــــــــــــــ	360	<u>U</u>	380 L		380	<u> </u>

Semivolatiles by GC/MS, HSL List

	Cust ID:	J10V70		J10V70)	J10V7)	J10V71		J10V72		J10V73	1
Sample	RFW#:	002		002 MS	3	002 MSI)	003		004		005	j
nformation	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
IIIOI macion	D.F.:	1.0	0	1.0	0	1.0	00	1.0	0	1.0	Q	1.0	0
	Units:	ug/K	g	ug/K	(g _.	ug/i	Kg	ug/K	g	ug/K	g	ug/K	ίg
	Nitrobenzene-d5	51	*	47	8	46	*	65	*	54	*	53	F
Surrogate	2-Fluorobiphenyl	55	*	65	ક	65	者	70	*	58	४	58	왐
Recovery	Terphenyl-d14	74	¥	72	*	71	ક્ષ	88	冬	80	ક	. 84	કૃ
recovery	Phenol-d5	51	& .	66	*	64	ક	64	%	54	*	53	¥
	2-Fluorophenol	49	¥	57	*	57	8	54	*	53	8	49	ક્ષ
	2,4,6-Tribromophenol	67	ኔ	82	*	84	*	81	*	60	*	68	8
	***************************************	360	≠fl==: U	78	e=fl=:	 74	==fl== %	360	≖fl=== U	360	=fl=== U	380	∓£ U
	thyl)ether	360	Ŋ	78	8	73	કૃ	360	บ	360	Ü	380	U
	ol	360	Ū	76	*	68	ě	360	Ū	360	Ü	380	U
2-Dichlorophenc	penzene	360	ū	72	*	65	ě	360	ū	360	Ū	380	U
. 4-Dichloron	penzene	36.0	Ū	68	*	63	8	360	ū	360	Ū	380	Ü
1.2-Dichlorof	penzene	360	Ū	. 76	*	70	8	360	Ū	360	Ū	380	U
2-Methylnhenc	01	360	0	73	*	67	ş	360	Ü	360	Ü	380	Ū
	-Chloropropane)	360	U	73	*	69	*	360	Ū	360	ū	380	Ū
	01	360	Ū	75	ş	72	*	360	Ū	360	Ū .	380	Ü
	n-propylamine	360	Ü	87	8	83	ş	360	ū	360	Ū	380	Ū
	nane	360	ט	66	8	59	e e	360	ט	360	บ	380	U
Nitrobenzene		360	σ	53	ક્ષ	51	*	360	Ū	360	U	380	U
Isophorone		360	oI	57	* %	54	* °6	360	υŢ	360	עמ	380	U
2-Nitrophenol		360	υJ	42	* %	39	* &	360	υĴ	360	บร	380	ΰ
2,4-Dimethyl		360	υĪ	48	* *	44	* %	360	UJ	360	UJ	380	U
	ethoxy) methane	360	ຫົ	54	*	52	ક	360	σ	360	D .	380	ΰ
2,4-Dichloro		360	υ	55	*	52	ક્ષ	360	Ū	360	Ū	380	บ
	orobenzene	360	UJ	54	* *	51	* %	360	υJ	360	U I	380	τ
Naphthalene		360	U .	51	¥	48	ક	360	α	360	U	380	τ
4-Chloroanil:		360	υ	66	*	65	ક	360	U	360	ט	380	U
Hexachlorobut		360	ซ	60	*	55	8	360-	U .	360	ט	380	Ü
	ethylphenol	360	υJ	61	¥	57	* %	360	ս 꿏	360	υJ	380	τ
2-Methylnaph		360	υJ	50	* %	52	* %	360	υJ	360	UJ	380	τ
	clopentadiene	360	U	45	¥	41	8	360	Ü	360	U	380	τ
2,4,6-Trichle		360	U	77	¥	76	ક	360	Ū	360	U	380	τ
2,4,5-Trichle		910	U	83	왐	80	*	900	Ü	910	Ū	940	Ţ

000014

N 3710/06

Report Date: 02/01/06 09:31

RFW Batch Number: 0601L140 Cust ID:	J10V70	J10V70	J10V70	J10V71	J10V72	J10V73
RFW#:	002	002 MS	002 MSD	003	004	005
2-Chloronaphthalene	360 U	77 %	75 %	360 U	360 U	380 U
2-Nitroaniline	910 U	83 %	81 %	900 U	910 U	940 U
Dimethylphthalate	360 U	78 %	77 %	360 U	360 U	380 U
Acenaphthylene	360 U	75 %	.74 %	360 U	360 U	380 U
2,6-Dinitrotoluene		79 %	77 %	360 U	360 U	380 U
3-Nitroaniline	910 U	97 %	95 %	900 U	910 U	940 U
Acenaphthene		75 ₺	74 %	360 U	360 U	380 U
2,4-Dinitrophenol	910 UJ	12 * %	16 * %	€ ت 900	910 U 🕽	940 U 🕽
-Nitrophenol	910 U	73 %	91 %	900 U	910 U	940 U
Dibenzofuran		76 %	76 %	360 U	360 U	380 U
2,4-Dinitrotoluene		83 %	80 %	360 U	360 U	380 U
of other late	360 U	75 %	79 %	360 U	360 U	380 U
Diethylphthalate	360 U	82 %	82 %	360 🗓	360 U	380 U
		82 %	81 %	360 U	360 U	380 U
Fluorene4-Nitroaniline	910 U	75 %	86 %	900 U	910 U	940 U
4,6-Dinitro-2-methylphenol		21 * %	22 * %	900 05	910 05	940 U.T
N-Nitrosodiphenylamine (1)		70 %	67 %	360 U	360 U	380 U
4-Bromophenyl-phenylether	360 U	75 %	71 %	360 U	360 U	380 U
Hexachlorobenzene		83 %	81 %	360 U	360 U	380 U
Pentachlorophenol	910 U	94 %	101 %	900 U	910 U	940 U
Phenanthrene	360 U	82 %	82 %	360 U	360 U	380 U
Anthracene		82 %	79 %	360 U	360 U	380 U
Carbarole	360 U	81 %	83 %	360 U	360 U	380 U
Carbazole	360 U	75 %	72 %	360 U	360 U	380 U
Fluoranthene	360 U	79 %	82 %		360 U	380 U
		86 %	88 %	43	360 U	380 U
PyreneButylbenzylphthalate	360 U	85 %	84 %	360 U	360 U	380 0
3,3'-Dichlorobenzidine	360 U	65 %	70 %	360 U	360 U	
Benzo (a) anthradene		79 %	85 %			
Chrysene	360 70	82 %	84 %	29 31	360 U	380 U
bis(2-Ethylhexyl)phthalate	LLO 150 JBV	91 %	87 %	110 50 50 50 13	(40 50 € JB U	380 U
Di-n-octyl phthalate	ኒ ፡ 150 ሀ 360 ሀ	101 %	101 %	360 0	360 U	160 99 16 JB
Benzo(b) fluoranthene	360 U	86 %	89 %	35 J		380 U
	360 U	86 %		35 U	360 U	380 U
Benzo(k) fluoranthene	360 U		87 % 81 %	. L /1	360 U	380 U
Benzo(a) pyrene	360 U	79 % 88 %		32 1/0	360 U	380 U
Indeno(1,2,3-cd)pyrene		90 %		21 ' 🔰	360 U	380 U
Dibenz(a,h)anthracene	360 U		90 %	360 U	360 U	380 U
<pre>Benzo(g,h,i)perylene (1) - Cannot be separated from Dip</pre>	360 U	82 % Outside of E	86 %	23	4 3/10	1 380 U

LIONVILLE LEDGESTORY, INC.

Semivolatiles by GC/MS, HSL List

Report Date: 02/01/06 09:31 Client: TNUHANFORD RC-020 K0197 Work Order: 11343606001 Page: 2a RFW Batch Number: 0601L140 J11108 SBLKTC SBLKTC BS Cust ID: 06LE0065-MB1 06LE0065-MB1 006 RPW#: Sample SOIL SOIL SOIL Matrix: Information 1.00 1.00 D.F.: 1.00 ug/Kg ug/Kg Units: ug/Kg -¥ 4 R 51 Nitrobenzene-d5 64 왐 75 ž 2-Fluorobiphenyl 57 Surrogate 84 Ł 84 Terphenyl-d14 Recovery 60 74 55 Phenol-d5 2-Fluorophenol 56 61 52 78 ş. 73 51 2.4.6-Tribromophenol 380 U 330 U 86 Phenol 330 U bis(2-Chloroethyl)ether____ 380 U 89 380 U 330 U 88 2-Chlorophenol 1,3-Dichlorobenzene 380 U 330 · U 82 380 U 330 U 81 1,4-Dichlorobenzene 380 U 330 U 89 1,2-Dichlorobenzene 380 U 330 IJ 2-Methylphenol 2,2'-oxybis(1-Chloropropane) 380 U 330 U 83 380 U 330 81 4-Methylphenol 380 U 330 100 N-Nitroso-di-n-propylamine Hexachloroethane 380 U 330 IJ 82 380 U 330 U 54 Nitrobenzene 380 UT 330 U 57 * * Isophorone 380 UJ 330 U 2-Nitrophenol 50 2,4-Dimethylphenol 380 UT 330 U 41 * % bis(2-Chloroethoxy)methane 380 U 330 II 56 380 U 330 U 53 2,4-Dichlorophenol UJ 1,2,4-Trichlorobenzene 380 330 U 57 * % 380 U 330 U Naphthalene 54 380 U 4-Chloroaniline 330 U 75 Hexachlorobutadiene 380 U 330 U 62 UT 4-Chloro-3-methylphenol 380 330 U 58 * % 380 UT 330 U 58 2-Methylnaphthalene U 330 U 380 86 * Hexachlorocyclopentadiene__ 380 U 330 U 82 ŧ 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 940 U 830 U 83 왍

*= Outside of EPA CLP QC limits.

	RFW Batch Number: Ubullity Cust ID:	J11108	i	SBLKTC	SBLKTC BS	3		
	RFW#:	006		06LE0065-MB1	06LE0065	MB1	1	
	2-Chloronaphthalene	380	U	330 U	87	8	8	
	2-Nitroaniline	940	σ	830 Ū	92	b	*	
	Dimethylphthalate	380	U	330 U	90	*	*	
	Acenaphthylene	380	U	330 U	88	. 8	%	
	2,6-Dinitrotoluene	380	Ū	330 U	95	*	*	
	3-Nitroaniline	940	Ū	830 U	110	8	*	
	Acenaphthene		Ū	330 U	86	¥	*	
	2,4-Dinitrophenol	940	UJ	830 U	4,2	å	%	
	4-Nitrophenol		<u>י</u>	830 U	97	8	*	
	Dibenzofuran	380	Ū	330 U	87	8	*	
	2,4-Dinitrotoluene		Ū	330 U		8	8	
	Diethylphthalate	380		330 U		. 8	ት .	
	4-Chlorophenyl-phenylether			330 U		ą	e B	
	Fluorene	380		330 U		9	*	
	4-Nitroaniline	940		830 U			*	
	4,6-Dinitro-2-methylphenol_						*	
	N-Nitrosodiphenylamine (1)		_	330 U				
	4-Bromophenyl-phenylether			330 U			•	
\bigcirc	Hexachlorobenzene			330 U			*	
	Pentachlorophenol			830 Ū	· ·		· ·	
	Phonanthrone	380		330 U			· ·	
	Phenanthrene			330 U				
_	AnthraceneCarbazole			330 U			*	
1	Di-n-butylphthalate	150		330 U			* · · · · · · · · · · · · · · · · · · ·	
			3	330 U		-	* *	
	Fluoranthene Pyrene	•		330 U			*	
	Butylbenzylphthalate	•		330 U			*	
	3,3'-Dichlorobenzidine	•		330 U			*	
	Benzo (a) anthracene	380		330 U			*	
	the state of the s	. 380		330 U			* *	
	Chrysenebis(2-Ethylhexyl)phthalate							
	Di-n-octyl phthalate	380	~	330 U			*	
		380		330 U			_	
	Benzo (b) fluoranthene	•		330 U			<u>ዩ</u>	
	Benzo(k)fluoranthene	•					&	
	Benzo(a) pyrene	380		330 U			*	
	Indeno(1,2,3-cd)pyrene			330 U			•	
	Dibenz(a,h)anthracene			330 U			*	
	Benzo(g,h,i)perylene	380	U	330 U	85	, ;	%	

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Case Narrative

Client: TNU-HANFORD RC-020

LVL#: 0601L140

SDG/SAF # K0197/RC-020

W.O. #: 11343-606-001-9999-00 Date Received: 01-25-2006

SEMIVOLATILE

Five (5) soil samples were collected on 01-19-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 01-26-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 01-29-2006.

The following is a summary of the OC results accompanying the sample results and a description of any problems encountered during their analyses:

- All results presented in this report are derived from samples that met LvLI's sample acceptance policy 1. with the exception of some discrepancies, which were documented on the Sample Receipt Checklist.
- Samples were extracted and analyzed within required holding time. 2.
- Non-target compounds were detected in the samples. 3.
- All surrogate recoveries were within acceptance criteria. 4.
- Fifteen (15) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance 5. criteria.
 - Five (5) of sixty-four (64) blank spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a 6. level less than the CRQL.
- 7. Internal standard area and retention time criteria were met.
- Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration"). 8.
- LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding 9. analytes/methods, please contact your Project Manager.
- I certify, that this sample data package is in compliance with SOW requirements, both technically 10. and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Daniels

Łaboratory Manager

Lionville Laboratory Incorporated

som\gorup\data\bna\tnu-hanford\0601-140.doc The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 0 pages.

Lionville Laboratory S	Sample Discrepancy Report	(SDR) SDR #: Ulmsoj6
Initiator: Sham Saylor Date: 1-31-06 Client: Thy	Batch: 0601L140 Samples: ms,msd,ks Method: SW848ycawwictpi	Parameter: 82 70
Improper Bottle Type Note: Verified by (Log-In) or [Prep Group] (cinc. Problem (Include all relevant specific for reway of Severiblen K.spila. 2. Known or Probable Causes(s)	ion ErrorWrong Test CodeO ontainer BrokenWrong Sa isufficient SamplePreservati ot Amenable to Analysis rde)signature/date:	ample PulledLabel 1D's Illegible ion WrongReceived Past Hold
3. Discussion and Proposed Action Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle) 4. Project Manager Instructionssigns Concur with Proposed Action Disagree with Proposed Action; Soliculde in Case Narrative Client Contacted;	7 9	
Date/Person Add Cancel 5. Final Actionsignature/date:	esti[analysis] (bircle) d, forward original to QA Specialist for	
Route Distribution of Completed SDR X initiator X Lab General Manager, M. T. X Project Mgr. Stone/Johnson Data Management. Stiwer Sample Prep: Beegle/Kiger	Route Distribution Metals Inorga GC/L MS: R	on of <u>Completed</u> SDR s: Beegle anic: Perrone C: Kiger Rychiak/Daley n: Perry

Washington Closur	e Hanford	CI	IAIN OF CUST	ODY/S	AMPLE	LANAL	YSIS	REQUEST	r	RC	-020-004	Page 1	of <u>2</u>
Collector Doug Bowers/C. Martinez			inv Contact g Bowers	Telepho 509-5	ne No. 31-0701	<u>,</u>		Project Coordi KESSNER, JH	nator	Price Code		Data Tu	maroun, O
Project Designation 100-BC Burisl Grounds - Sci	l Full Protocol		ing Location -B-20 (1716-B Maint Ga	rage UST				SAF No. RC-020		Air Quality		7 2.	و د پ
Ice Chest No. AFS-	04-057		Loebook No. -1173-7	·	COA	4 - A@	<u>Q</u>	Method of Shir Fed ex	ment				989
Shipped To EBERLINE SERVICES / LK	ONVILLE	Offsite	Property No.	7060	261		, 	Bill of Lading	Air Bill	No. 50	e 05	PC	·
POSSIBLE SAMPLE HAZA	. 1		ļ	l	1		ļ						į
none < DOT	Limits		Preservation	N=	Noos	Cool 4C	Cool		Nume				
Special Handling and/or S	torage		Type of Container	G/P	G	aG t	aG J	aG	G	G 1			
Cool 4 degrees centigrade			No. of Container(s)			Ŀ							
		. !	Volume	250	500mL	250ml.	250a	aL 250mL	250cm	L 250mL	i i		
00021	SAMPLE ANAL	.YSIS		See item (1) is Special O Instructions	See item (2) in Special Instructions.	PC86 - 3082	Seni-Vi 8276A (lenistii 1010		·		·
1 2													
Sample No.	Matrix *	Sample Date	Sample Time										
J10V88		11A @	2 of raigh						 				
J10V69	SOIL	ollialo	6 08 25	\	~	_	_		1				
J10V70	SOIL	مالاواه	6 0958	7	_	7	7		1	7			
J10V71	SOIL	01/191		7		7		. –	-				
J10V72	SOIL	011191	06 1010	7		7	~		_	7			
CHAIN OF POSSESSIO		Sign/Prin			SPE	CIAL INSTE	UCTIO	ONS					Matrix *
Refinquished By/Removed From Refinquished By/Removed From 3728 2B -24-0. Refinquished By/Removed From Refinquished By/Removed From Refinquished By/Removed From Refinquished By/Removed From	Tato Time	Roceived By/Stor R2 St-eff Received By/Stor C6 Fed E Roceived By/Sto	red in D	/- 2/-	(1) Cada Nick (2) Silve	mium, Calchum, el, Potassium, S	Chromiu icleainan TCLP) -	e List) (Aluminus, m. Cobalt, Copper, Silicon, Silver, Sod 1311/6010 (Arsenic 311/7470	iros, Léad ium, Vana	. Magnesium, Mus, dium, Zine); Merci	ga ncsc, Mol ybo ury <i>- 7470 -</i> (C	lenum, V)	S-Suil SE_Schmust SC_Sold SisStodge W = Water Co-Oil A-AAr Dis-Dram Solids Di.s.Dram Lepada T-Tistic Wi-Wigs LeLaqued VaVept status X=Other
LABORATORY Received B	у			Ţ	itle					······································	. D	Date/Time	<u> </u>
FINAL SAMPLE Disposal M DISPOSITION	lethod	<u>-</u>				Disp	osed By			· · · · · · · · · · · · · · · · · · ·	1	Date/Tinic	

Washington Closure Hanford	CHAIN OF CUST	CODY/SAM	IPLE ANAL	YSIS	REQUEST	·	RC	-020-004	Page 2 of 2
Collector Doug Bowers/C. Martinez	Company Contact Doug Bowers	Telephone No 509-531-07			Project Coordi KESSNER, JH	nator	Price Code		Data Turnaround
Project Designation 100-BC Burial Grounds - Soil Full Protocol	Sampling Location 100-B-20 (1716-B Maint Ga	arage UST	•		SAF No. RC-020		Air Quality		1 days
Ice Chest No. AFS - 04 - 057	Field Logbook No. EFL-1173-7		0A 1 BX4- A02	ರಿಲ	Method of Ship Fed ex	uneni.			
Shipped To BBERLINE SERVICES LIONVILLE	Offsite Property No.	10602	61		Bill of Lading/	Air Bill N	Va.	See O.	SPC
POSSIBLE SAMPLE HAZARDS/REMARKS		1 . 1							
none < por Limits	Preservation		Nose Cool 4C	Cool 4		None	Cool 4C		
Special Handling and/or Storage	Type of Container	G/P	G aG	■G	aG	G	G		
Cool 4 degrees centigrade	No. of Container(s)	1	1 1	E	1	ı	1		
	Volume	250g 5	00ml. 250mL	250sr	al 250mil	250mL	250mL		
SAMPLE ANALYSIS		Special S	bean (2) in PCRs - 8062 pocial ructions.	Screi-VC 8270A (lgaitahility 1010	- 17H (Total) - 418.1		
)22									
Sample No. Matrix * Sar	nple Date Sample Time								
J10V73 SOIL SU\	19/06 1015	7 -	- \	\ \ <u>\</u>			_ \		-
J11108 SOIL 011	19/06 12/8	7	<u>~. \ </u>		·		7		
JITIK2 SOIL CE	2011100					-			
		 -		╂					
CHAIN OF POSSESSION	Sign/Print Names	<u> </u>	SPECIAL INSTI	RIKTTO	INS	<u> </u>		<u> </u>	Matrix *
Relimputshed By/Removed From Date/Time \720 Rece	ved By/Stored In D	ale/Time \7 16	1						
[martines] [martines of/19/1011 3		10/00	Cadenium, Calcium,	. Chromiu	t List) (Alaminum, A m, Cobalt, Copper, I	ron, Lead, i	Magnesium, Man	ganese, Molybd	Fig. SE=Sectional
Reliaquished ByfRemoved From Date/Sime Rece 3728 28 /-24-06 /000 RZ	""" " " " " " " " " " " " " " " " " "	yte/Time /000 /-24-06	Nickel Potassium.	Scienium,	Sificon, Silver, Sodi 1311/6010 Arsenic,	uen. Yanadi	ium, Zinc]; Merc	шку - 7470 - (С1	V) Sjackjer
Relinquished Ry/Removed From Date/Time 1500 Rece RZ Steffly 12 Lill 1 - 24-06 F		ate/Time	Silver]; Mercury (T	CLP) - 13	11/7470				Overal AntAir DS-Oran Bo
Retinquished By/Removed From Date/Time Rece		Date/Time			•				CLeOrum La T=Tistle WinVige
Relinquished By/Removed From Date/Time Rece		ote/Time	1						L=Lupid Y=Vegetalus X=Other
Retinquished By/Removed From Date/Time Rece	ived By/Stored fa D	Date/Time	1						
LABORATORY Received By SECTION		Title			****	<u> </u>		D	bute/Time

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

LEVEL:	<u> </u>			D	
PROJECT: {	00-B-2	0 6	DATA PACKAG	E: K019,7	
VALIDATOR:	TLR	LAB:	\mathcal{I}		5/00
			SDG: K-C	197	
		ANALYSES	PERFORMED		
SW-846 8260		SW-846 8260 (TCLP)	W-846 8270		SW-846 8270 (TCLP)
SAMPLES/MAT	I RIX				<u> </u>
210	VIO J	10171 31	ONIS J	T ETVOL	T11(08
					
				N/19	
				· · · · · · · · · · · · · · · · · · ·	
. DATA PA	ACKAGE COMP	LETENESS AND C	CASE NARRATIV	E	Soil
echnical verificati	ion documentation	present?	••••••		
echnical verificati	ion documentation	present?			
echnical verificati Comments: INSTRUM CC/MS tuning/perf	MENT TUNING	AND CALIBRATIO	DN (Levels D and F	E)	Yes No N/
echnical verificati comments: INSTRUM C/MS tuning/perf	MENT TUNING formance check ac	AND CALIBRATIO	DN (Levels D and E	Ē)	Yes No N/
INSTRUM GC/MS tuning/perfinitial calibrations a	MENT TUNING formance check acacceptable?	AND CALIBRATIO	ON (Levels D and I	E)	Yes No N/
INSTRUM GC/MS tuning/performatical calibrations a	MENT TUNING formance check ac acceptable? ions acceptable?	AND CALIBRATIC	DN (Levels D and I	Ē)	Yes No N/Yes No N/
E. INSTRUM GC/MS tuning/performitial calibrations a Continuing calibrate Standards traceable Standards expired?	MENT TUNING formance check ac acceptable?ions acceptable?	AND CALIBRATIO	ON (Levels D and I	E)	Yes No N/

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)	
Calibration blanks analyzed? (Levels D, E)	Yes No NA
Calibration blank results acceptable? (Levels D, E)	Xes No (N/A
Laboratory blanks analyzed?	
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N
Transcription/calculation errors? (Levels D, E) Comments: D13 (2 + by hexy) phthelete in mb.	Yes No NA
	no FB
4. ACCURACY (Levels C, D, and E)	
Surrogates/system monitoring compounds analyzed?	
Surrogate/system monitoring compound recoveries acceptable?	
Surrogates traceable? (Levels D, E)	
Surrogates expired? (Levels D, E)	
MS/MSD samples analyzed?	\ \ \
MS/MSD results acceptable?	
MS/MSD standards NIST traceable? (Levels D, E)	Yes No W
MS/MSD standards? (Levels D, E)	Yes No (V/
LCS/BSS samples analyzed?	(.Y)s No N/
LCS/BSS results acceptable?	Yes (No) N/
Standards traceable? (Levels D, E)	Yes No (N/
Standards expired? (Levels D, E)	Yes No (N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/
Performance audit sample(s) analyzed?	Yes (No) N/
Performance audit sample results acceptable? Comments: MS/MSD bosh 7 - J all MSD - 1 J all	Yes No N/
LC5- 5 I 24	

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5.	PRECISION (Levels C, D, and E)		·	
MS/MS	SD samples analyzed?	Yes	No	N/A
MS/MS	SD RPD values acceptable?		No	N/A
MS/MS	Yes	No	(NA)	
MS/MS	SD standards expired? (Levels D, E)		No	
Field d	uplicate RPD values acceptable?	(Yes	No	N/A
Field sp	plit RPD values acceptable?	Yes	NQ	N/A
Transci	ription/calculation errors? (Levels D, E)	Yes	No	N/A
Comme	ents:			
		<u>. </u>		
6.	SYSTEM PERFORMANCE (Levels D and E)			
Interna	ıl standards analyzed?	Yes	No	N/A
	al standard areas acceptable?			, ,
Interna	al standard retention times acceptable?	Yes	No	N/A
	rds traceable?			١.
Standar	rds expired?	Yes	No	N/A
Transc	ription/calculation errors?	Yes	No	MXX
Comm	nents:			
			<u> </u>	
7.	HOLDING TIMES (all levels)			
Sample	es properly preserved?	/Ye	No	N/A
Sample	e holding times acceptable?	Yes	No	N/A
	nents:	$\overline{}$		
	·			

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETEC	CTION LIMITS (all
levels)	
Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/)
Samples properly prepared? (Levels D, E)	Yes No (1)A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes (N) N/A
Transcription/calculation errors? (Levels D, E)	\sim
9. SAMPLE CLEANUP (Levels D and E)	
GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A
Comments:	<u> </u>

Date:

16 March 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-20

Subject:

Wet Chemistry - Data Package No. K0197-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0197 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample (D.e.	Sample Bare		w.Validation	Date
J10V70	1/19/06	Soil	С	See note 1
J10V71	1/19/06	Soil	C	See note 1
J10V72	1/19/06	Soil	С	See note 1
J10V73	1/19/06	Soil	С	See note 1
J11108	1/19/06	Soil	С	See note 1

^{1 -} Total petroleum hydrocarbons by 9071/418.1.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, Rev. 4, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for TPH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the laboratory reporting that the sample container had broken in transit, all TPH results in sample J11108 were qualified as estimates and flagged "J".

All other holding times were met.

Method Blanks

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

Accuracy

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

Precision

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between

the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J10V70/J10V71) were submitted for analysis. Field duplicates are analyzed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

Completeness

Data package K0197 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the laboratory reporting that the sample container had broken in transit, all TPH results in sample J11108 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- U Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: KO197 REVIEWER PROJECT: 100-B-20 PAGE 1 OF 1						
COMMENTS:	QUALIFIER	SAMPLES AFFECTED	REASON			
TPH	J	J11108	Sample container broken in transit.			

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSU	RE HAN	FORD]			
Lab: LLi	SDG: K0197										
Sample Number		J10V70		J10V71		J10V72		J10V73		J11108	
Remarks				Duplicate				1			
Sample Date		1/19/06		1/19/06		1/19/06		1/19/06		1/19/06	
Wet Chemistry	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Total Petroleum Hydrocarbons	5	144	U	145	U	144	U	150	U	150	IJ

INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L140

	•		•		REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
					****	-
-001	J10V69	* Solids	99.9	ŧ	0.01	1.0
-002	J10V70	% Solids	91.8	ŧ	0.01	1.0
		Petroleum Hydrocarbons	144 ц	MG/KG	144	1.0
-003	J10 V7 1	% Solids	92.2	4 .	0.01	1.0
		Petroleum Hydrocarbons	145 u	MG/KG	145	1.0
-004	J10V72	% Solids	92.0	ŧ	0.01	1.0
		Petroleum Hydrocarbons	144 u	MG/KG	144	1.0
-005	J10V73	% Solids	86.2	*	0.01	1.0
		Petroleum Hydrocarbons	150 u	MG/KG	150	1.0
-006	J11108	% Solids	88.3	•	0.01	1.0
		Petroleum Hydrocarbons	150 u.	MG/KG	150	1.0

3/14/01

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD RC-020 K0197

LVL#: 0601L140

W.O.#: 11343-606-001-9999-00

<u>2/2/06</u> Date

Date Received: 01-25-06

INORGANIC NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

- 3. Sample holding times as required by the method and/or contract were met.
- 4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy with the exception of Petroleum Hydrocarbon (PHC) sample J11108 as noted on the Sample Receipt Checklist.
- 5. The method blanks for PHC were within the method criteria.
- 6. The Laboratory Control Samples (LCS) PHC were within the laboratory control limits. The duplicate LCS 06LHC008-MB1 was within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recovery for PHC was within the 75-125% control limits.
- 8. The replicate analyses for PHC and Percent Solids were within the 20% RPD control limit.
- 9. Results for solid samples are reported on a dry weight basis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

njp\i01-140

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

000013

03

Lionville Laboratory Incorporated SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: TNU HantorD

Date: 1.2506

Purchase Order / Project# / SAF#/SOW#/Release#:

LvLI Batch #:

Sample Custodian: NOTE: EXPLAIN ALL DISCREPANCIES 402 972L Samples Hand Delivered of Shipped Comments Custody seals on coolers or shipping ☐ No Seals □ No container intact, signed and dated? Outside of coolers or shipping containers are X Yes □ No free from damage? 4. All expected paperwork received (coc and DYY es □ No other client specific information) sealed in plastic bag and easily accessible? Cooler # AFS -04 . 057 Temp 0.8 5. Samples received cooled or ambient? Custody seals on sample containers intact, Z Yes ☐ No Seals □ No signed and dated? coc signed and dated? Z Yes □ No (HAT-8011 C) (SOO # ONE Sample containers are intact? ☐ Yes Rec'd broken-able All samples on coc received? All samples **⊿**Yes □ No received on coc? 10. All sample label information matches coc? Z Yes $\square N_0$ Z Yes 11. Samples properly preserved? □ No 12. Samples received within hold times? Ja Yes □ No Short holds taken to wet lab? 13. VOA, TOC, TOX free of headspace? ☐ Yes □ No ZINA QC stickers placed on bottles designated by ☐ Yes 15. Shipment meets LvLI Sample Acceptance ☐ Yes Policy? (Identify all bottles not within policy. See reverse side for policy) 16. Project Manager contacted concerning ZÍ Yes □ No □ No discrepancies? name/date (or samples Discrepancies outside criteria)



Washington Closur	e Hanford	CI	HAIN OF CUST	ODY/SA	MPLE	ANALY	YSIS	REQUEST		RC	-020-004	Page 1	of 2
Collector Doug Howers/C. Martinez			iny Contact g Bowzis	Telephone l 509-531-				Project Coordi KESSNER, JH	nater	Price Code Data To			rnaround .
Project Designation 100-BC Burial Grounds - Soil	Full Protocol		ing Location B-20 (1716-B Maint Ga	rage UST				SAF No. RC-020		Air Quality		73.	مس عسنا
ice Chest No. AFS -	04-057		oghook No. -1173-7		COA NBX	1-A0	0	Method of Ship Fed ex	ment	<u></u>			
Shipped To EBERLINE SERVICES / LIONVILLE Offsite Property No.			Preperty No.	10602	61	·		Bill of Lading/	Air Bill N	€ 5 _€	ec o	SPC	
POSSIBLE SAMPLE HAZA	RDS/REMARKS			1								1	
none L POT	Limits	•.	Preservation	None	None	Cool 4C	Conl 4		None	Coel 4C			
Curriel Handiban and Inn C	lance		Type of Container	G/P	G	a.G	aG	aG .	G	G		<u> </u>	
Special Handling and/or S Cool 4 degrees centigrade	wrage		No. of Container(s)	l	1	1	i	1	Ĺ	1			
0.1			Volume 3	250g	500ml.	250mL	250m	aL 250mL	250ml.	. 250mL			
00015	Sample anai	.YSIS	ં	Special	e item (2) in Special autractions	PCB4 - 8062	Sensi-V0 \$270A (lgmitability 1010	- TPH (Total) - 418.1			
Sample No.	Matrix *	Sample Date	Sample Time				E 1678						
J16V68	SOII	MAC				w spin server				and a contract of the second	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	I BRIGGE MADE 1-47	
J10V69	SOIL	ollia					 		_		 -	 	
J10V70	SOIL	01/19/0		-	_	7	V		~.	7			
J10V71	SOIL	01/19/		7	_	7		-	_		1-		
J10V72	SOIL	011191	06 10 10	7	_	7	~		_				
CHAIN OF POSSESSIO		Sign/Prin			SPEC	LAL INSTR	WCTIC	ONS					Matrix *
Relinquished By/Removed From	Date/Time 1720			ate/Time\740	/n r	'D Matala (A)	IA (Clien	t List) (Aluminum, a	Antimo	Annala Dadwa 1	h		S=Soil
cweativeste ma	the outsing			19/00	Cade	kon, Calcium,	Chromiu	m, Cobult, Copper, I	run Lead	Magnesium, Man	panese, Molyb	deoun.	SE-Sedement SO-Solid
Relinquished By/Removed From	Thue/Time	Received By/Sto	Kr	ate/Time /uo	Nicke	i, Potassium, S	iclepium,	Silicon, Silver, Sodi 311/6010 [Arsenic	um, Vanad	ium, Zinc ; Merc	ury - 7470 - ((CVI	SI=Studge
3728 28 1-24-06 Relinquished By Removed From RC Stert 14 1-25	Date/Time 150	ر کو مسر		/- 2/-# uc/Time	Silver	}; Mercury (T(CUP) - 13	131./7470 ·	, parum, C	aomun, Chromi	uni, Lead, Seje	usmu"	W = Water OnOil AnAir OS=Orem Salida OL-Osma Liquida
Relined ished By/Removed From	Date/Time	Received By/Sto	Thich 12	Side 191	7								T=Time Wi=Wipe L=Liqued
Relinquished By/Removed From	Date/Time	Received By/Sen		atc/Time	`		÷						V=Vegetation X=Other
Relinquished By/Removed From	Date/Time	Received By/Sta	red to D	atc/Time		•							
LABORATORY Received By SECTION	,			Title	:						,	Date/Time	
FINAL SAMPLE Disposal M													

Washington Closure Hanford	CHAIN	OF CUST	ODY/SA	MPLE	ANAL	YSIS	REQUEST		RC	-020-004	Page 2	of <u>2</u>
Collector Dong Bowers/C. Martinez	Company Cont Doug Bowers		Telephone 509-531				Project Coordi KESSNER, JH	nator	Price Code		Data Tu	rnaround
Project Designation 100-BC Burial Grounds - Soil Pull Protocol	Sampling Loca 100-B-20 (17	ation 716-B Maint Ga	rage UST		,		SAF No. RC-020		Air Quality		7 das	٠ م
Ice Chest No. AFS - 04 - 057	Field Logbook EFL-1173-7			COA	14- A08	<u> </u>	Method of Ship Fed ex	ment	<u> </u>			
Shipped To EBERLINE SERVICES ALKONVILLE	Offsite Propert	ty No.	060	261	/		Bill of Lading/	Air Bill N	ia.	rec c	05PC	•
POSSIBLE SAMPLE HAZARDS/REMARKS												
none < POT Limits	Pro	escryation	None G/P	None	Cool 4C	Coel		None	Const 4C			
Special Handling and/or Storage	Туре	of Container	G/F	u .	20	яG	₽G	G				
Cool 4 degrees centigrade	No. of	Container(s)	l.	1	I	1	. 1	1	ı			
	,	Volume	250g	500mL	250mL	250s	uL 250mL	250mL	250mL			
SAMPLE ANALYSIS			See here (1) in Special Internations.	ice hem (2) in Special Instructions.	PCB4 - 9042	Semi-V0 \$270A (*		Ignitability 1010	- TPH (Total) - 418.1			
)16			·									
Sample No. Matrix * Sam	ole Date	Sample Time										
J10V73 SOIL O(\\	2/06	1015	7	_	7	7		-	~			
J11108 SOIL 0111	9/06	१२१४	7	_	7			-				
STITIKZ SOIL: CO.	011191	106						_	-			
						 -			<u> </u>		 	
CHAIN OF POSSESSION S	ign/Print Names		<u>. </u>	SPEC	IAL INSTR	UCTIO	NS		<u> </u>	<u> </u>	<u> </u>	Matrix *
	ed By/Stored In		te/Time (~7)	8			List) (Aluminum, A		lancala Baaisaa 1) D		9=\$cril
Cmartinez C. Martine 01/9/01/37 Relinquished By/Removed From Data Fire Received	<u>28 29</u>		testime /de	Cadn	ium, Calcium, I	Chromiu	sa, Cobalt, Copper, I	ron, Lead, h	Magnesium, Man	ranese, Molvi	odenum.	SE-Soliment SCI-Solid
3728 2B 1-24-06 1000 RZ	Stilly R.	? <i>[Hill</i>]	1-24-6	(2) N	letals by ICP (ICLP) - 1	Silicon, Silver, Sodi 1311/6010 (Arsenic,	Barium, Ca	nim, Zinc]; Merci admium, Chroniu	ary - 7470 - () um, Lead, Sele	CV) enium,	SI=Sludge W = Water
Relinquished By Removed From 9 Date Time 1500 Received St. St. St. C. 24-06 Fe		Da	te/Time	Silves); Mescury (TO	ÇLP) - 13	11/7470					O=Oil A=Air D3=Dryan Sulids DL=Dryan Luyads
	S. Whi		Me/Time	$\overline{\downarrow}$	-							T-Tissae Wi-Wips Leilopid
	ed By/Stored Is		ite/Time	_								V=Vegetation X=Other
Relinquished By/Removed From Dute/Time Receiv	ed By/Stored In	Da	te/Time	7								
LABORATORY Received By SECTION		· · · · · · · · · · · · · · · · · · ·	Title	 _							Date/Time	· I
FINAL SAMPLE Disposal Method DISPOSITION					Pate	sed By					Date/Time	·

Data Validation Supporting Documentation

LEVEL:	A	В	C	D	E
PROJECT: /	00-13-3	20	DATA PACKAC	EE KOIG	7
VALIDATOR:	TLI	LAB: L1	I	T	5/06
			SDG:	K0197	
		ANALYSES	PERFORMED		
Anions/IC	тос	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI	рН	NO ₃ /NO ₂
Sulfate	TDS	TKN	Phosphate		
SAMPLES/MAT	RIX				
J10170	J101	U71 J1	t STVO	10073 J	11/0%
				•	
					50,1
Technical verificati		oresent?		/E	Yes No N/.
Technical verificati Comments: INSTRU	ion documentation p	oresent?	LIBRATIONS (Le	vels D and E)	
Technical verificati Comments: INSTRUE	ion documentation particles of the second se	IANCE AND CA	LIBRATIONS (Le		Yes No N/
Comments: INSTRUM Initial calibrations a	MENT PERFORM performed on all insacceptable?	IANCE AND CA	LIBRATIONS (Le	vels D and E)	Yes No N/2
Comments: INSTRUM Initial calibrations of the control of the cont	MENT PERFORM performed on all insacceptable?	HANCE AND CA	LIBRATIONS (Le	vels D and E)	Yes No N/2
Comments: INSTRUM Initial calibrations of the control of the cont	MENT PERFORM performed on all insacceptable?	IANCE AND CA	LIBRATIONS (Le	vels D and E)	Yes No N/A
2. INSTRUM Initial calibrations of the control of t	MENT PERFORM performed on all ins acceptable? cks performed on al	IANCE AND CA	LIBRATIONS (Le	vels D and E)	Yes No N/A
2. INSTRUM Initial calibrations of the control of t	MENT PERFORM performed on all ins acceptable? cks performed on al	IANCE AND CA	LIBRATIONS (Le	vels D and E)	

3. BLANKS (Levels B, C, D, and E)	
ICB and CCB checks performed for all applicable analyses? (Lev	vels D, E) Yes No N/A
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A
Laboratory blanks analyzed?	
Laboratory blank results acceptable?	No N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) A
Field blank results acceptable? (Levels C, D, E)	Yes No 🕊
Transcription/calculation errors? (Levels D, E)	Yes No (N/A
Comments:	NO FB
	0 F-P-1
4. ACCURACY (Levels C, D, and E)	
Spike samples analyzed?	(Yes) No N/A
Spike recoveries acceptable?	
Sike standards NIST traceable? (Levels D, E)	Yes No N/A
Spike standards expired? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No (N/)
Transcription/calculation errors? (Levels D, E)	Yes No 1
Performance audit sample(s) analyzed?	Yes (No) N/A
Performance audit sample results acceptable?	Yes No (N/)
Comments:	
•	***

5.	PRECISION (Levels C, D, and E)				
Duplica	te RPD values acceptable?		******************	**	Yes No N/A
Duplica	ate results acceptable?	***************************************		***************************************	Yes No NA
MS/MS	SD standards NIST traceable? (Levels D,	E)		*****************	Yes No N/A
MS/MS	SD standards expired? (Levels D, E)		**************	<pre><pre></pre></pre>	Yes No N/A
Field d	uplicate RPD values acceptable?			***************************************	Yas No N/A
	olit RPD values acceptable?				
	ription/calculation errors? (Levels D, E)				
	ents:				<u> </u>
6.	HOLDING TIMES (all levels)			.1	
Sample	es properly preserved?	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	z/46	Yes No N/A
-	holding times acceptable?			, i	Yes No N/A
•	ents:				
				-	
	Sangelo centara	broken.	- 1	all 1	T11108

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)	
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes (No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A
Comments: Oll over	
The second secon	

Additional Documentation Requested by Client

INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/01/06

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

WORK	ORDER:	11343-606-001-9999-00
HORK	ORDER:	11343-000-001 3333 44

					VE COULTING	DIDUITOR
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	FACTOR
		***********	*******			
BLANK10	06LHC006-MB1	Petroleum Hydrocarbons	133 u	MG/KG	133	1.0
BLANK10	06LHC008-MB1	Petroleum Hydrocarbons	133 u	MG/KG	133	1.0

INORGANICS ACCURACY REPORT 02/01/06

CLIENT: TNUHANPORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L140

			SPIKED	INITIAL	SPIKED		dilution
Sample	SITE ID	ANALYTE	SAMPLE	RESULT	TMUOMA	*RECOV	FACTOR (SPK)
*=====				57 47 832	****	李女女亲	
-002	J10V70	Petroleum Hydrocarbons	566	83.6	603	80.0	1.0
BLANK10	06LHC006-MB1	Petroleum Hydrocarbons	529	133 u	560	94.5	1.0
BLANK10	06LHC008-MB1	Petroleum Hydrocarbons	559	133 u	560	99.8	1.0
		Petroleum Hydrocarbons	536	133 u	560	95.7	1.0

INORGANICS DUPLICATE SPIKE REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

WORK ORDER: 11343-606-001-9999-00

			GFIAD#.	•	
Sample	SITE ID	ANALYTE	*RECOV	*RECOV	*DIFF
W	在 全 有 全 电 电 电 电 电 电 电 电 电 电 电 电 电 电 电 电 电	*****************			
BLANK10	06LHC008-MB1	Petroleum Hydrocarbons	99.8	95.7	4.2

and the Europe William Was to Mary the control of the control

INORGANICS PRECISION REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

WORK ORDER: 11343-606-001-9999-00

			INITIAL		•	DILUTION
Sample	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)
		*********		*******		*******
-002REP	J10V70	Petroleum Hydrocarbons	144 u	144 ս	NC	1.0
~003REP	J10V71	* Solids	92.2	92.5	0.27	1.0

Date:

16 March 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-20

Subject: PCB - Data Package No. K0197-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0197 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Mainge Die	Sample Date	MeHall /	. Validation	Date
J10V70	1/19/06	Soil	С	See note 1
J10V71	1/19/06	Soil	С	See note 1
J10V72	1/19/06	Soil	С	See note 1
J10V73	1/19/06	Soil	С	See note 1
J11108	1/19/06	Soil	С	See note 1

^{1 -} PCBs by 8082.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for nondetects. If holding times are exceeded by greater than two times the limit, all

associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blank

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

· Accuracy

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows

000002

have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

· Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J10V70/J10V71) were submitted for analysis. Field duplicates are assessed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

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· Completeness

Data Package No. K0197 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG: K0197	REVIEWER: TLI	PROJECT: 100-B-20	PAGE_1_OF_1
COMMENTS: No qualif	iers assigned		

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON (CLOSUI	RE HANF	ORD	9							
Laboratory: LLI	SDG: I	K0197		<u></u>			_	_			
Sample Number		J10V70		J10V71		J10V72		J10V73		J11108	
Remarks		<u> </u>		Duplicate							
Sample Date		1/19/06		1/19/06		1/19/06		1/19/06		1/19/06	
Extraction Date		1/26/06		1/26/06		1/26/06		1/26/06		1/26/06	
Analysis Date		1/27/06		1/27/06		1/27/06		1/28/06		1/28/06	
PCB	RQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	15	Ü	14	U	14	U	15	U	15	U
Aroclor-1221	100	15	Ü	14	U	14	Ü	15	U	15	U
Arocior-1232	100	15	U	14	Ű	14	U	15	U_	15	
Arocior-1242	100	15	U	14	U	14	U	15	Ü	15	
Aroclor-1248	100	15	U	14	U	14	IJ	15	Ū	15	U
Aroclor-1254	100	15	U	14	U	14	Ü	15	U	15	U
Aroclor-1260	100	8.5		8.0		14	U	8.5		15	U

HIGHVILLE HENGTEROXY, THE.

PCBs by GC Report Date: 01/31/06 12:34

			PCBs	-		.1. 0			-		1/31/06 1	2:3
RFW Batch Numbe	r: 0601L140	Client: T	U-HANFORD RC-	<u>020</u>	WO	rk U	rder: 1134	360600	or bade:			
	Cust ID:	J10V70	J10V70		J10V70		J10V71		J10V72		J10V7	3
Sample	RFW#:	002	002 MS		002 MSD		003		094		00.	•
Information	Matrix:	SOIL	SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00	1.00		1.0		1.0		1.0	_	1.	
	Units:	UG/KG	UG/KG		UG/K	G	UG/K	3	UG/K	G	UG/	KG
Surrogate: Te	trachloro-m-xylene	78	78	*	67	*	70	*	72	ŧ	71	1
	Decachlorobiphenyl	76 1	. •	ŧ	66.	*	69	*	71	*	72	1
		_	1=========							-fl-		
		15 t		*	82	¥	14	Ū	14	U	15	
		15 T		U	15	Ū	14	ប	14	U	15	
Aroclor-1232		15 T	— 	Ū	15	U	14	U	14	Ū	15	
Aroclor-1242	· · · · · · · · · · · · · · · · · · ·	15 t		U	15	U	14	ū	14	U	15	τ
Aroclor-1248		15 (15	U	15	Ū	14	Ŭ	14	U	15	Ţ
Aroclor-1254 Aroclor-1260		15 t 8.5 d		U	15 86	U	· 14 8.0	U	14	U	15 8.5	
· ·	Cust ID:	J11108	PBLKAO		PBLKAO BS		, <u></u>	····	·			
Sample Information	⟨ RFW#:	006	06LE0066-MB	1	06LE0066-M	B1						-
Information	Matrix:	SOIL	SOIL		SOIL							
	D.F.:	1.00	1.00)	1.0	0						
	Units:	UG/KG	UG/KG		UG/K	_						
	trachloro-m-xylene	69		ક	72	ŧ						
				Ł	72	2						
*****	Decachlorobiphenyl	70 1		-		-		£1				
Aroclor-1016		15 T	1========	-		-	=======	=fl==	******	=fl=	李尺二三三宗称二二	==;
Aroclor-1016 Aroclor-1221		15 T	13	fl=	*******	=fl=		=f1==	等有权平分 法告诉2	=fl=	* 5, 5, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	==;
Aroclor-1016 Aroclor-1221 Aroclor-1232		15 T	1 13 1 13	fl= U	87	=fl=	W 11	-f1	**************************************	=f1=	*	==
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242		15 (15 (15 (15 (1 13 1 13 1 13	fl= U U	87 13	=fl= % U	V3/1	6) o t		==f1= (军内共应重要 排立立	==
Aroclor-1016_Aroclor-1221_Aroclor-1242_Aroclor-1248_		15 (15 (15 (15 (15 (1 13 1 13 1 13 1 13	fl= U U U	87 13 13	=fl= % U	K3/1	-f1 6) o ¹	M 1/31	==f1=	\$ F, E, E E E , E E E	:==
Aroclor-1016_Aroclor-1221_Aroclor-1242_Aroclor-1248_		15 (15 (15 (15 (15 (13 1 13 1 13 1 13 1 13	fl= U U U U	87 13 13	=fl= % U U	P3/1	-f1	A6 1/31	=f1=	* 5, 5, 6 * 5 * 6 * 5	==

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Laboratory Narrative and Chain-of-Custody Documentation



Case Narrative

Client: TNU-HANFORD RC-020

LVL#: 0601L140

SDG/SAF # 1/097/ RC-020

W.O. #: 11343-606-001-9999-00 **Date Received: 01-25-2006**

PCB

Five (5) soil samples were collected on 01-19-2006.

The samples and their associated QC samples were extracted on 01-26-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 01-27,28-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- All results presented in this report are derived from a sample that met LvLI's sample acceptance policy. 1.
- The samples were extracted and analyzed within required holding time. 2.
- The samples and their associated QC samples received Copper-Sulfur, and Sulfuric Acid cleanups according to 3. Lionville Laboratory SOPs based on SW846 methods 3660A, and 3665A respectively.
- The method blank was below the reporting limits for all target compounds. 4.
- All obtainable surrogate recoveries were within acceptance criteria. 5.
- The blank spike recoveries were within acceptance criteria. 6.
- All matrix spike recoveries were within acceptance criteria. 7.
- The initial calibrations associated with this data set were within acceptance criteria. 8.
- The continuing calibration standards analyzed prior to sample extracts were within acceptance 9. criteria.
- LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For 10. a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- I certify that this sample data package is in compliance with SOW requirements, both technically and for 11. completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Laboratory Manager

Lionville Laboratory Incorporated

rt\r:\group\data\pest\tnu hanford\0601-140.pcbs The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

000013

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Preservation Now Now Now Now Now Now Cord 4C Cor	Ice Chest No. AFS -	04-057			·		<u> </u>	<u> </u>			ent .		<u>,</u>		
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SAMPLE ANALYSIS Service Special Expression Supple Time Sample No. Matrix * Sample Date Sample Time J16V68 SOIL 119 So International Supplementary Source		storage	•	No. of Container(s)	<u> </u>	1	1.	ı		1	1	1	·		
Sample No. Matrix * Sample Date Sample Time J10V68 SOM 119 Co 21119 Co 31119 Co 3119 Co 31119 Co 3119	C			Volume			L 250mL	250	mL :	250mL	250mL	250mL			
Sample No. Matrix * Sample Date Sample Time JHOV68 SOIL 119 Co 2 1 119 Co 3 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	00014	SAMPLE ANAL	YSIS		South!	Specie	1				- ,				
J10V70 SOIL J10V71 SOIL J10V71 SOIL J10V71 SOIL J10V71 SOIL J10V72 SOIL J10V71 SOIL J10V72 SOIL J10V72 SOIL J10V73 SOIL J10V73 SOIL J10V74 SOIL J10V75 SOIL J10V75 SOIL J10V75 SOIL J10V76 SOIL J10V77 SOIL J10V76 SOIL J10V77 SOIL J10V76 SOIL J10V76 SOIL J10V77 SOIL J10V77 SOIL J10V77 SOIL J10V76 SOIL J10V76 SOIL J10V76 SOIL J10V76 SOIL J10V77 SOIL J10V77 SOIL J10V76 SOIL J10V77 SOIL J10V77 SOIL J10V77 SOIL J10V76 SOIL J1		Matrix *	Sample Date	Sample Time		4200									
J10V70 SOIL 01/9/04 0-9-2-5 JIOV71 SOIL 01/9/04 10-9-3 JIOV71 SOIL 01/9/04 10-9-3 JIOV71 SOIL 01/9/04 10-9-3 JIOV71 SOIL 01/9/04 10-9-3 JIOV72 SOIL 01/9/04 IIOV72 SOIL 01/9/04 IIOV72 JIOV72 J	J10V60-	soil	21A (c	John John				110,121121	ATTENDED		2002	4 19 19 19 19 19 19 19 19 19 19 19 19 19			- The state of the
J10V72 SOIL 01 19 06 10 10 10 10 10 10 10 10 10 10 10 10 10	J10V69	SOIL	Olligle		T .					_		_			†
J10V71 SOIL J10V6 O 1 D	J10V70	SOIL	01/19/0	6 0958	~	_	7	T ~		-	_	7			· .
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CILAIN OF POSSESSION Sign/Frint Names Relinquished By/Removed From Date/Time Received By/Stored in Date/Time Date/Time Date/Time Date/Time Received By/Stored in Date/Time Date/Time Received By/Stored in Date/Time Date/Time Received By/Stored in Date/Time Received By/Stored in Date/Time Date/Time Date/Time Received By/Stored in Date/Time Date/Time Received By/Stored in Date/Time	J10V72	SOIL	01/19/	06 1010	7	1	7	~							1
Contine Tile West of India 3 > 3 College (1) ICP Metals - 6010 (Client List) (Abunimum, Antimony, Arcaic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobat, Copper, Grium, Cadmium, Cadmium, Calcium, Chromium, Cadmium, Calcium, Chromium, Cadmium, Chromium, Cadmium, Chromium, Cadmium, Chromium, Lead, Scientum, Silver, Sofium, Silver, Sofium, Silver, Sofium, Silver, Sofium, Vasadium, Chromium, Lead, Scientum, Silver, Sofium, Silver, Sofium, Vasadium, Chromium, Lead, Scientum, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Cadmium, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Cadmium, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Cadmium, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Calcium, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Calcium, Chromium, Lead, Scientum, Silver); Metals by ICP (ICLP) - 1311/6010 [Arrenic, Barium, Calcium, Chromium, America, Scientum, Silver, Scientum, Sci	CHAIN OF POSSESSIO					SI	PECIAL INST	RUCTIO	ONS					L	Matrix *
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LABORATORY Received By Title Date/Time SECTION FINAL SAMPLE Disposed Method Disposed By Date/Time	Relinglished By Removed From	Date/Time 1-25-06 09/6	Received By/Su	Thick 13	SOLO	9/5			·						NAME DS-Drand Solids DIDrand Laquids T-Tissue Win-Wign Lu-Liquid V=Vegelatori X=Other
SECTION FINAL SAMPLE Disposed Method Disposed By Date/Time	Relinquished By/Removed From	Date/Time	Received By/Sto	red In C	Date/Time										
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DISPOSITION	FINAL SAMPLE Disposel N DISPOSITION	fethod					Dis	posed By					1	Date/Time	

Washington Closur	e Hanford	C	HAIN OF CUST	rody/sa	MPLI	ANAL	YSIS	REQUEST		RC-	-020-004	Page 2	of <u>2</u>
Collector Doug Bowers/C. Martinez			any Contact g Bowers	Telephone 509-531			·	Project Coordi KESSNER, JH	nator	Price Code		Data Tu	rnaround C
Project Designation 100-BC Burial Grounds - Soi	Pull Protocol		ing Location -B-20 (1716-B Maint Ga	urage UST	· · · · · · · · · · · · · · · · · · ·			SAF No. RC-020		Air Quality		7 das	وه م
Ice Chest No. AFS -	04-057		Loghoek No. -1 173-7	<u> </u>	COA	X4- A02	00_	Method of Ship Fed ex	ment	<del></del>			9886
Shipped To EBERLINE SERVICES ALI	ALIIVNC	Offsite	Property No.	1060	26	/		Bill of Lading	Air Bill I	٠٠. <u>ح</u>	Sec 0	15PC	
POSSIBLE SAMPLE HAZA	RDS/REMARKS	<del></del>					١				ļ		
none L POT	Limits		Preservation	None	None	Cool 4C	Cool	4C Cool 4C	None	Cuol 4C			
65 - 1-1 TV 411 a 21 6			Type of Container	G/P	G	∎G	, KG	.aG	G	G			
Special Handling and/or S  Cool 4 degrees centigrade	torage		No. of Container(s)	1	1	1	1	1	I	1			
1			Volume	250g	500mL	250mL	250a	nL 250mL	250mi	250mL			
000015	Sample anai	YSIS		Sec item (1) in Special Instructions.	Sce item (2) à Special Instructions.	PCBs-8002	Sceni-Vi 8270A (		lgnitebilit 1010	- TPH (Total) - 418.1			
5													
Sample No.	Matrix *	Sample Date	Sample Time				÷12.						
J10V73	SOIL	ollalos		7		>	_	,		\ <u>\</u>			
J11108	SOIL	0111910	७ । २१४	7		>	<u> </u>	4		1			
JIIIK2	SOIL	10 01	Tiglow				-						<u> </u>
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CHAIN OF POSSESSIO	N	Sign/Prin	! Names	<del></del>	SPE	CIAL INSTR	UCTIO	ONS	1		<u></u>		Matrix *
Relinquished By/Removed From	Date/Time (72)			ate/Time いつえ	5			t List) (Ahmiana, i	Astisanou	Armenia Berium I	Dentlium Ros		S=Solf
	Detertions			10/00 gte/Time /0	Cuda	mium, Culcium,	Chromiu	m, Coball, Copper, I	ron, Lead.	Magnesium, Man	ganese, Molyb	deawn.	SE=Satignest SQ=Solid
Retinquished By/Removed From 3728 2B 1-24-0	6 1000	Received By/Stor	CA2 Still	/-24-	06 (2)	Metals by ICP (	TCLP) -	Silicon, Silver, Sodi 1311/6010 (Arsenic	um, Vanad , Barium, C	ium, Zinc ); Merci Adminm, Chromic	ary <i>- 7470 -</i> (C am, Lead, Se)e:	.°V) uiqm,	Si-Sludge W.e. Water
Relinquished Ry/Removed From	Date/Time 150	O Received By/Sto		ate/Time	Silw	er); Mercury (TO	CLP) - 13	3UJ/7479		·		٠	O-OH AnAir D5-Druce Sulids
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FINAL SAMPLE Disposal M DISPOSITION	ethod	·····				Dispo	becd By	···				Date/Time	
DIN FER ALL MARINAGES										·			

**Data Validation Supporting Documentation** 

## PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(c)	D	E
PROJECT: /	00-13-20		DATA PACKAG	E: 1201	97
VALIDATOR:	TII	LAB: LLT		DATE: 3/5	5/06
			SDG:	(0147	
		ANALYSES I	PERFORMED		
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MAT	RIX				
JIOVT	o Jiov	71 5101	U72 J	70073	7/11/08
	· · · · · · · · · · · · · · · · · · ·		***************************************		
					5001
Technical verificat Comments:	ion documentation	present?			Ye (No) N/A
2. INSTRU	MENT PERFORM	IANCE AND CAL	LIBRATIONS (Lev	vels D and E)	
	MENT PERFORM				Yes No N/A
Initial calibrations Continuing calibra	acceptable?tions acceptable?				Yes No N/A
Initial calibrations Continuing calibra Standards traceable	acceptable?tions acceptable?				Yes No N/A Yes No N/A
Initial calibrations Continuing calibra Standards traceable Standards expired?	acceptable?tions acceptable?				
Initial calibrations Continuing calibra Standards traceable Standards expired? Calculation check	acceptable?e??				Yes No N/AYes No N/AYes No N/AYes No N/A
Initial calibrations Continuing calibra Standards traceable Standards expired? Calculation check DDT and endrin by	acceptable?tions acceptable?	ple?			Yes No N/AYes No N/AYes No N/AYes No N/A

## PCB DATA VALIDATION CHECKLIST

BLANKS (Levels B, C, D, and E)	
Calibration blanks analyzed? (Levels D, E)	Yes No (N)
Calibration blank results acceptable? (Levels D, E)	Yes No W
aboratory blanks analyzed?	(Yes) No N/
aboratory blank results acceptable?	Yes No N/
ield/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N
ranscription/calculation errors? (Levels D, E)	
Comments:	No FB
· · · · · · · · · · · · · · · · · · ·	
	· · · · · · · · · · · · · · · · · · ·
ACCURACY (Levels C, D, and E)	
Surrogates analyzed?	(Yes) No N
Surrogate recoveries acceptable?	Ye No N
Surrogates traceable? (Levels D, E)	Yes No (N
Surrogates expired? (Levels D, E)	
MS/MSD samples analyzed?	
MS/MSD results acceptable?	Yes No N
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N
MS/MSD standards expired? (Levels D, E)	Yes, No (N
CS/BSS samples analyzed?	
.CS/BSS results acceptable?	Ves No N
Standards traceable? (Levels D, E)	Yes No(N
Standards expired? (Levels D, E)	
Transcription/calculation errors? (Levels D, E)	Yes <u>No</u> (N
Performance audit sample(s) analyzed?	Ye:(Nô) N
Performance audit sample results acceptable?	Yes No (N
Comments:	No PA

# PCB DATA VALIDATION CHECKLIST

5.	PRECISION (Levels C, D, and E)	
Dupli	icate RPD values acceptable?	(Yes) No N/A
Dupli	icate results acceptable?	Yes No N/A
MS/N	MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/N	MSD standards expired? (Levels D, E)	Yes No N/A
Field	duplicate RPD values acceptable?	Yes No 1
Field	split RPD values acceptable?	Yes No (N/A
Trans	scription/calculation errors? (Levels D, E)	Yes No N/A
Comi	ments:	
6. Chro	SYSTEM PERFORMANCE (Levels D and E) matographic performance acceptable?	Yes No N/A
	ive results resolved acceptably?	ł 1
	ments:	
7.	HOLDING TIMES (all levels)	
•	ples properly preserved?	<b>1</b> 1
Samp	ple holding times acceptable?	Yes No N/A
Com	ments:	

# PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND I	DETECTION LIMITS (all	
levels)		1
Compound identification acceptable? (Levels D, E)	Yes	Nd NA
Compound quantitation acceptable? (Levels D, E)	Yes	No (N/A)
Results reported for all requested analyses?	(Yes)	No N/A
Results supported in the raw data? (Levels D, E)	Yes	No N/A
Samples properly prepared? (Levels D, E)		No W
Detection limits meet RDL?	Yes	No N/A
Transcription/calculation errors? (Levels D, E)	Yes	Ng N/A
Comments:		
9. SAMPLE CLEANUP (Levels D and E)		$\Diamond$
Fluoricil ® (or other absorbent) cleanup performed?		, ,
Lot check performed?	Yes	No N/A
Check recoveries acceptable?	Yes	No N/A
GPC cleanup performed?	Yes	No N/A
GPC check performed?	Yes	No N/A
GPC check recoveries acceptable?	Yes	No N/A
GPC calibration performed?	Yes	No N/A
GPC calibration check performed?	Yes	N N/A
GPC calibration check retention times acceptable?	Yes	No N/A
Check/calibration materials traceable?	Yes	No N/A
Check/calibration materials Expired?	Yes	No N/A
Analytical batch QC given similar cleanup?	Yes	No N/A
Transcription/Calculation Errors?	Yes	No \N/A
Comments:		$\overline{}$
		<del>12</del>

Date:

16 March 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-BC Burial Grounds - Soil Full Protocol - Waste Site 100-B-20

Subject: Inorganics - Data Package No. K0197-LLI

# INTRODUCTION

This memo presents the results of data validation on Data Package No. K0197 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

	Sample Date	TO WARE SET IN	i.≇Válidation	Date
J10V69	1/19/06	Soil	C	See note 1
J10V70	1/19/06	Soil	С	See note 1
J10V71	1/19/06	Soil	С	See note 1
J10V72	1/19/06	Soil	C	See note 1
J10V73	1/19/06	Soil	С	See note 1
J11108	1/19/06	Soil	С	See note 1

^{1 -} ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

# DATA QUALITY PARAMETERS

### Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

# · Preparation (Method) Blanks

# Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the calcium and silicon results in sample J10V69 were qualified as estimates and flagged "UJ".

All other preparation blank results were acceptable.

# Field (Equipment) Blank

One field blank (J10V69) was submitted for analysis. Aluminum, barium, iron, manganese, magnesium, sodium and zinc were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

#### Accuracy

# Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J".

Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to matrix spike recoveries outside QC limits, the mercury result in samples J10V70 and J11108 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### · Precision

# **Laboratory Duplicate Samples**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

# Field Duplicate

One set of field duplicates (J10V70/J10V71) were submitted for analysis. Field duplicates are assessed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

# Completeness

Data package No. K0197 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

# **MAJOR DEFICIENCIES**

None found.

# MINOR DEFICIENCIES

Due to method blank contamination, the calcium and silicon results in sample J10V69 were qualified as estimates and flagged "UJ". Due to matrix spike recoveries outside QC limits, the mercury result in samples J10V70 and J11108 were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

# REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

# Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

# METALS DATA QUALIFICATION SUMMARY*

SDG: Kendy COMMENTS:	等高級個級型高級 中共1970年,1970年,1970年	<b>Figur</b> 20:3-20:	PAGE 1-OF 1
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Calcium Silicon	UJ	J10V69	Blank contamination
Mercury	J	J10V69, J10V73	MS recovery

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

# Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD					]								
Lab: LLI	SDG:	K0197						1					
Sample Number	er .	J10V69		J10V70		J10V71		J10V72		J10V73		J11108	
Remarks		E. Blank				Duplicate							
Sample Date		1/19/06		1/19/06		1/19/06		1/19/06		1/19/06		1/19/06	
Inorganics	RQL	Result	Q	Result	Q	Result	σ	Result	œ	Result	Q	Result	Q
Silver	0.2	0.13	U	0.14	υ	0.14	J	0.14	U	0.15	U	0.15	
Aluminum		39.8		4580		5260		5330		7320		7500	П
Arsenic	10	0.32	Ū	1.5		2.0		2.1		2.6		2.8	
Boron		0.25	υ	1.8		1.7		2.2		3.7		1.8	_
Barium	2	0.93		52.0		68.1		57.1		65.3		72.7	
Beryllium		0.02		0.24		0.23		0.30		0.30		0.32	$\Box$
Calcium		19.5	IJ	3840	Г	4240		3550		3130		3290	
Cadmium	0.2	0.46	Ū	0.50	Ų	0.50	U	0.50	υ	0.52	U	0.53	Ū
Cobalt		0.11	U	10.7	Г	11.2		9.6		8.5		8.9	Г
Chromium	1	0.49	U	5.3		6.5		7.7		12.1		9.4	
Copper		0.11	U	15.5		15.7		18.9		14.0		43.3	
Iron		80.0		20000		20700		18700		21700		20400	
Mercury	0.2	0.02	U	0.02	J	0.02	U	0.01	U	0.02	U,	0.33	J
Potassium		50.9	U.	758		862		956		1600		1290	
Magnesium		6.2		3740		4130		4090		3920		3950	
Manganese		1.9		287		347		354		242		289	
Molybdenum		0.12	Ü	0.58		0.56		0.60		0.39		0.51	
Sodium		6.9		121	L.	119		130		127		168	
Nickel	_	1.2	J	7.9		8.0		10.3		10.8		10.5	
Lead	5	2.7	U	15.5		20.9		4.0		7.3		8.4	
Antimony		0.38	υ	0.41	U	0.41	U	0.41		0.43		0.43	U
Selenium	1		U	0.37	U	0.44		0.37	U	0.39	U	0.39	1 =
Silicon		31.1	IJ	511		435		708		571		543	
Vanadium		0.08	U_	63.9		51.6		51.7		51.7		51.9	
Zinc	1	0.63		62.3		67.6		43.9		45.1		326	·

### INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 NORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

					rbporting	DILUTION
Sample	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
	*******		*******	*****	*******	*****
-001	J10V69	Silver, Total	0.13 u	MG/KG	0.13	1.0
	· ·	Aluminum, Total	39.8	MG/KG	2.9	1.0
		Argenic, Total	0.32 u	NG/KG	0.32	1.0
		Boron, Total	0.25 u	MG/KG	0.25	1.0
		Barium, Total	0.93	MG/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Calcium, Total	19.5 85	MG/KG	1.8	1.0
		Cadmium, Total	0.46 u	MG/KG	0.46	1.0
		Cobalt, Total	0.11 u	MG/KG	0.11	.1.0
		Chromium, Total	0.49 u	MG/KG	0.49	1.0
	,	Copper, Total	0.11 u	MG/KG	0.11	1.0
		Iron, Total	80.0	MG/KG	0.93	1.0
		Mercury, Total	0.02 1	MG/KG	0.02	1.0
		Potassium, Total	50.9 น	MG/KG	50.9	1.0
		Magnesium, Total	6.2	MG/KG	1.3	1.0
		Manganese, Total	1.9	NG/KG	0.50	1.0
		Molybdenum, Total	0.12 u	Mg/Kg	0.12	1.0
		Sodium, Total	6.9	MG/KG	2.7	1.0
		Nickel, Total	1.2 u	MG/KG	1.2	1.0
		Lead, Total	2.7 u	HG/KG	2.7	1.0
		Antimony, Total	0.38 u	MG/KG	0.38	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Silicon, Total	31.1 UJ	MG/KG	0.77	1.0
		Vanadium, Total	0.08 u	MG/KG	0.08	1.0
		Zinc, Total	0.63	MG/KG	0.05	1.0

Blook

# INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

					reporting	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
******			******			*****
-002	J10V70	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	4580	MG/KG	3.1	1.0
	•	Arsenic, Total	1.5	MG/KG	0.35	1.0
		Boron, Total	1.8	MG/KG	0.28	1.0
		Barium, Total	52.0	NG/KG	0.02	1.0
		Beryllium, Total	0.24	ng/kg	0.02	1.0
		Calcium, Total	3840	HG/KG	2.0	1.0
		Cadmium, Total	0.50 u	MG/KG	0.50	1.0
		Cobalt, Total	10.7	MG/KG	0.12	1.0
		Chromium, Total	5.3	MG/KG	0.53	1.0
	×1	Copper, Total	15.5	NG/KG	0.12	1.0
		Tron, Total	20000	MG/KG	1.0	1.0
		Mercury, Total	0.02 J	HG/KG	0.02	1.0
		Potassium, Total	758	MC/KG	55.5	1.0
		Magnesium, Total	3740	MG/KG	1.4	1.0
		Manganese, Total	287	MG/KG	0.54	1.0
		Molybdenum, Total	0.52	MG/KG	0.13	1.0
		Sodium, Total	121	MG/KG	2.9	1.0
		Nickel, Total	7.9	MG/KG	1.3	1.0
		Lead, Total	15.5	MG/KG	2.9	1.0
		Antimony, Total	0.41 u	MG/KG	0.41	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Silicon, Total	511	MG/KG	0.84	1.0
		Vanadium, Total	63.9	ng/kg	0.09	1.0
	•	Zinc, Total	62.3	MG/KG	0.05	1.0

### INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANPORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	ONITS	LIMIT	FACTOR
******	工作不包括的自己和公司的企业社会有点的	<b>事件目标要求实现工程设置全线技术等级的表现</b>	*****	***		openies.
-003	J10V71	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	5260	MG/KG	3.1	1.0
		Arsenic, Total	2.0	MQ/KG	0.34	1.0
		Boron, Total	1.7	MG/KG	0.27	1.0
		Barium, Total	68.1	MG/KG	0.02	1.0
		Beryllium, Total	0.23	NG/KG	0.02	1.0
		Calcium, Total	4240	MG/KG	2.0	1.0
		Cadmium, Total	0.50 u	NG/KG	0.50	1.0
		Cobalt, Total	11.2	MG/KG	0.12	1.0
		Chromium, Total	6.5	MG/KG	0.53	1.0
		Copper, Total	15.7	MG/KG	0.12	1.0
		Iron, Total	20700	MG/KG	. 1.0	1.0
	•	Mercury Total	0.02 u	MG/KG	0.D2	1.0
		Potassium, Total	862	MG/KG	54.7	1.0
		Magnesium, Total	4130	MG/KG	1.4	1.0
	•	Manganese, Total	347	MG/KG	0.54	1.0
		Molybdenum, Total	0.56	MG/KG	0.13	1,0
		Sodium, Total	119	MG/KG	2.9	1.0
		Nickel, Total	B.D	MG/KG	1.3	1.0
		Lead, Total	20.9	MG/KG	2.9	1.0
		Antimony, Total	0.41 u	MG/KG	. 0.41	1.0
		Selenium, Total	0.44	NG/KG	0.37	1.0
		Silicon, Total	435	MG/KG	0.83	1.0
		Vanadium, Total	51.6	MG/KG	0.09	1.0
		Zinc. Total	67.6	MG/KG	0.05	1.0

2/10/66

### INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0601L140

		•			REPORTING	DILUTION
Sanple	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	PACTOR
*****	**************	<b>美国市在亚巴科茨萨兰共中沙坦亚在西</b> 亚亚亚亚	******		*********	
-004	J10V72	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	6330	MG/KG	3.1	1.0
		Armenic, Total	2.1	MG/KG	0.35	1.0
		Boron, Total	2.2	MG/KG	0.27	1.0
		Barium, Total	57.1	MG/KG	0.02	1.0
		Seryllium, Total	0.30	MG/KG	0.02	1.0
•		Calcium, Total	3550	MG/KG	2.0	1.0
	•	Cadmium, Total	0.50 u	NG/KG	0.50	1.0
		Cobalt, Total	9.6	MG/KG	0.12	1.0
		Chromium, Total	7.7	NG/KG	0.53	1.0
	•	Copper, Total	18.9	NG/KG	0.12	1.0
		Iron, Total	18700	NG/KG	1.0	1.0
	•	Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Potassium, Total	956	MG/KG	54.8	1.0
		Magnesium, Total	4090	MG/KG	1.4	1.0
		Manganese, Total	354	NG/KG	0.54	1.0
		Molybdenum, Total	0.60	MG/KG	0.13	1.0
		Sodium, Total	130	MG/KG	2.9	1.0
		Nickel, Total	10.3	MG/KG	1.3	1.0
		Lead, Total	4.0	MG/KG	2.9	1.0
		Antimony, Total	0,41 ц	MG/KG	0.41	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
	*	Silicon, Total	708	MG/KG	0.83	1.0
		Vanadium, Total	51.7	MG/KG	0,09	1.0
		Zinc, Total	43.9	MG/KG	0.05	1.0

3/10/06

#### INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
*****	*********	医保护性缺乏性性性性 医甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基				****
-005	J10V73	Silver, Total	0.15 u	MG/KG	0.15	1.0
		Aluminum, Total	7320	MG/KG	3.3	1.0
		Arsenic, Total	2.6	NG/KG	0.36	1.0
		Boron, Total	3.7	MG/KG	0.29	1.0
		Barium, Total	65.3	MG/KG	0.02	1.0
		Beryllium, Total	0.30	.MG/KG	0.02	1.0
	•	Calcium, Total	3130	NG/KG	2.1	1.0
		Cadmium, Total	0.52 u	MG/KG	0.52	1.0
		Cobalt, Total	8.5	MG/KG	0.13	1.0
		Chromium, Total	12.1	MG/KG	0.56	1.0
		Copper, Total	14.0	mg/kg	0.13	1.0
		Iron, Total	21700	MG/KG	1.1	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1600	MG/KG	57.7	1.0
		Mægnesium, Total	3920	MG/KG	1.4	1.0
		Manganese, Total	242	ng/kg	0.57	1.0
		Molybdenum, Total	0.39	MG/KG	9.14	1.0
		Sodium, Total	127	MG/KG	3,0	1.0
		Nickel, Total	10.8	MG/KG	1.4	1.0
		Lead, Total	7.3	MG/KG	3.0	1.0
		Antimony, Total	0.43 u	MG/KG	0.43	1.0
		Selenium, Total	0.39 u	MG/KG	0.39	1.0
		Silicon, Total	571	MG/KG	0.88	1.0
		Vanadium, Total	51.7	MG/KG	0.1	1.0
		Zinc, Total	45.1	MG/KG	0.05	1.0

M/0/d

#### INORGANICS DATA SUMMARY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

-					REPORTING	DILUTION
SAMPLE	di atia	ANALYTE	RESULT	Units	LINIT	FACTOR
		- 8 名誉 8 月 年 李 珠 林 林 本 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗 宗	222222			감당학자들의학교
-006	J11108	Silver, Total	0.15 u	NG/KG	0.15	1.0
		Aluminum, Total	7500	MG/KG	3.3	1.0
		Arsenic, Total	2.8	MG/KG	0.37	1.0
		Boron, Total	1.8	MG/KG	0.29	1.0
		Barium, Total	72.7	MG/KG	0.02	1.0
	•	Beryllium, Total	0.32	MG/KG	0.02	1.0
		Calcium, Total	3290	MG/KG	2.1	1.0
		Cadmium, Total	0.53 u	MG/KG	0.53	1.D
		Cobalt, Total	8.9	MG\KG	0.13	1.0
		Chromium, Total	9.4	MG/KG	0.56	1.0
		Copper, Total	43.3	MG/KG	0.13	1.0
		Iron, Total	20400	MG/KG	1.1 .	1.0
		Hercury, Total	0.33	MG/KG	0.02	1.0
		Potassium, Total	1290	HG/KG	58.2	1.0
		Magnesium, Total	3950	MG/KG	1.5	1.0
		Manganese, Total	289	MG/KG	0.57	1.0
		Molybdenum, Total	0.51	MG/KG	0.14	1.0
		Sodium, Total	168	Mg/Kg	3.0	1.0
		Nickel, Total	10.5	MG/KG	1.4	1.0
		Lead, Total	8.4	HG/KG	3.1	1.0

1/10/de

Antimony, Total

Selenium, Total

Silicon, Total

Vanadium, Total

Zinc, Total

0.43 u MG/KG

0.39 u MG/KG

MG/KG

MG/KG

MG/KG

0.43

0.39

Q.88

0.1

1.0

1.0 1.0

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



# Analytical Report

Client: TNU-HANFORD RC-020

LVL#: 0601L140

SDG/SAF#: K0197/RC-020

W.O.#: 11343-606-001-9999-00

Date Received: 01-25-06

# METALS CASE NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. The samples were rerun for Aluminum, Beryllium, Calcium, Cadmium, Chromium, Iron, Lead, Manganese, Nickel, Potassium, and Sodium due to sample matrix.
- 3. All analyses were performed within the required holding times.
- 4. Please refer to the Sample Receipt Check List for sample discrepancies in LvLI's sample acceptance policy.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. The preparation/method blanks for 2 analytes were outside method criteria. {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
  - a). The MB results for Calcium and Silicon were greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level} and sample J10V69 read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample results were reported herein "uncorrected" for the levels found in the MB.
- 8. All ICP Interference Check Standards were within control limits.
- All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 77.6%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 28 pages.

The Control of the Control of the Control

- 10. The matrix spike (MS) recoveries for 5 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
- 11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration level for the following analytes:

		<u>PDS</u>	<u>PDS</u>
Sample ID	<u>Element</u>	Concentration (ppb)	% Recovery
J10V70	Iron	80,000	70.3
	Antimony	100	105.3
	Silicon	2,100	108.0
	Vanadium	1,000	105.0

- 12. The duplicate analyses for 8 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 15. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

jjw/m01-140

≥ (3106 Date



	Washington Clos	ure Hanford	l_CI	HAIN OF CUST	CODY/S.	<u>AMPLE</u>	E ANALY	<b>YSIS</b>	REQUEST		RC	-020-004	lage I	or <u>2</u>
	Collector Doug Bowers/C. Martinez	<del></del>		any Contact g Bowers	Telephor 509-52	ne <b>No.</b> 31-0701			Project Coordi KESSNER, JH	nator	Price Code		Data Tu	mustonus, Q
	Project Designation 100-BC Buriel Grounds - 5			ine Location -B-20 (1716-B Maint Ga	rage UST		· · · ·		SAF No. RC-020		Air Quality	' <b>□</b>	7 3	24 5 B
	Ice Chest No. AFS -	-04-057		Loghock No. -1173-7		COA	4 ~ A@	0	Method of Ship Ped ex	ment				9000
	Shipped To EBERLINE SERVICES		Offsite	e Property No.	4060	261			Bill of Lading	Air Bill	No. 5	ec O	SPC	0
* 1	POSSIBLE SAMPLE HA	,			None	Nuns	Coul 4C	Carel 4	C Conl4C	None	Cool 4C			
	HORSE Z DO /	Limits		Preservation									<u> </u>	
	Special Handling and/or	r Storage		Type of Container	G/P	G	εG	≇G	åG	G	G			<u> </u>
	Cool 4 degrees centigrade			No. of Container(s)	1	ļ ,	'	1	1	1	1	٠ .	<u> </u>	
· .	•		· <del>·</del>	Volume	250g	500mL	250mL	250m	iL 250mL	250m	L 250mL			
		SAMPLE ANAI	LYSIS		Sec item (1) in Special Offustructions.	See item (2) in Special Instructions.	PCB ₂ -8062	Seni-YC \$276A (1		ignkabiti 1010				
ŽÁ.	Sample No.	Matrix *	Sample Date	Sample Time	Table in Anth	(energickette		77° - 18				S Marchan		To the state of th
	J19V88	SOIL	71A (			ALEUNO,								
00	J10V69	SOIL	01/19/0	<del></del>			<del>-</del>					<del></del>	<del> </del>	<del> </del>
	J10V70	SOIL	01/18/0		-		<del>                                     </del>	┖		_			<del> </del>	<del> </del> -
20	J10V71	SOIL	01/19/		7	_	7			_	<del>  \</del>		<del>                                     </del>	1
, O	J10V72	SOIL	011191		7	-	7	<b> </b>		_			<del>                                     </del>	<del>                                     </del>
Y.	CHAIN OF POSSESS		Sign/Prin			SPE	CIAL INSTR	UCTIO	NS	<u> </u>			<u> </u>	Matrix *
	Relinquished By/Removed From C. Mrs. Cl. Mrs. Cl	Date/Time	Received By/Sto  Received By/Sto	2B 011 PM	nte/Time 7 3	(1) 1 Code Nick (2) 1	nium, Calcium, el. Potassium. S	Chromhu Iclenium, I TCLP) - 1	List) (Aluminum, n. Cobalt, Copper, l Silicon, Silver, Sodi 1311/6010 (Arsenic 11/7470	iron, Lead ium, Vans	, Magnesium, Man dium, Zine I: Mere	iganese, Molyb	denum, CV)	S=Solisment SC=Solid SC=Solid SH=Shadge W = Water C=OH A=Air DS=Druss Solids
13. 	Relinquished By/Removed From Relinquished By/Removed From	Date/Time	Received By/Sto	United 12	ate/Time  5.04 O	715								Di.»Drum Legald: TuTinum WinWipe LuLiquid VaVegelatum X=Other
	Relinquished By/Removed From	Date/Time	Received By/Sto	red In D	ate/Time				-			•		
	LABORATORY Received SECTION	l By			Tie	tle					·	1	Date/Time	<del>-</del>
	FINAL SAMPLE Disposal DISPOSITION	Method					Dispo	ned By					Date/Time	

Washington Closus	re Hanford	C	HAIN OF CUST	CODY/S	AMPL	E ANAL	YSIS	REQUEST	Γ	RC	-020-004	Page 2	of 2
Collector Doug Bowers/C. Martinez			eny Contact ng Bowers	Telephor 509-5	ne No. 31-0701			Project Coordi KESSNER, JH	nator	Price Code		Data Ti	rnaround
Project Designation 100-BC Burial Grounds - So	il Pull Protocol		l <b>ing Locatio</b> n )-B-20 (1716-B Maint Ga	rage UST				8AF No. RC-020		Air Quality		م کم	- C
Ice Chest No. AFS -	04-057		Leghook No. L-1173-7		COA	X4- 800	00_	Method of Shir Fed ex	ment				9999
Shipped To EBERLINE SERVICES	ONVILLE	Offsi	e Property No.	1060	26	/		Bill of Lading	Air Bill	No.	sec 0	SPC	Ø
POSSIBLE SAMPLE HAZA	RDS/REMARKS												
none L POT	- Limits		Preservation	None	None	Cool 4C	Cool		None			_	ļ
Special Handling and/or S	Storage		Type of Container	G/P	G	aG	aG	. æG	G	G			
Cool 4 degrees centigrade	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		No. of Container(s)	1	1	. 1	1	1	J	1			
			Volume	250g	500mi.	250mL	250m	aL 250mL	250m	L 250mL			
	SAMPLE ANAI	YSIS		See item (1) in Special Instructions,	See lees (2): Special Instructions		Semi-Vo 8270A (		l <u>eritabili</u> 1010				
Sample No.	Matrix *	Sample Date	Sample Time										
J10V73	SOIL	عدارعاه	6 LD15	7		_				\(\tag{\tag{\tag{\tag{\tag{\tag{\tag{			
J11108	SOIL	0111918				7		, 5	_				<del> </del>
JIIIK2	SOIL	(62) 01		-	-								<del> </del>
			1,100			<del></del>	·			+-	ļ—		<del>                                     </del>
	,												
CHAIN OF POSSESSIO		Sign/Prin	t Names	<del>!</del>	SPE	CIAL INSTR	UCTIO	ONS	<u> </u>		<u> </u>		Matrix *
Relinquisted By/Removed From	Date/Time (720	f -		tte/Time (**)	રેઇ			t List) (Akuminum, a	Antimose	Arrania Barina I	lacultium Dann		SeSed
Relinquished By/Removed From	Deletime	011 3728 Received By/Stp		te/Time /	CM	intion, Calcium, (	Chromius	ra Cobrakt, Cooper, i	ron Lead.	. Magnesium, Mans	ranese. Molyhd	CM103	SE=Solinent SO=Solid
3728 28 1-24-0		RZ Stiff		1-24		Metals by ICP (	exalum, PCLP) - I	Silicon, Silver, Sodi  311/6010 (Arsenic	um. Vanac Baritim, (	dium, Zinc); Mercu Cadminm, Chromio	ry - 7470 - (C' m. Lead. Selon	V) ium.	M=Shript W = Weet
Relinquished By Removed From RZ Steffler R. 2. L.	Date/Time 150	10 Received By/Sto		ite/Time	Silv	er}; Mercury (T(	CLP) - L3	11/7470				·	O-Qil A#Air D3#Drym Solida
Relinquished By/Removed From	Date/Time	Received By(Su		ite/Time									OL-Dram Legade Tellistae
1-400 CV 1.	9201 TOJIE	<u> </u>	hush 1921	<u>56/09</u>	15								Wi=Wipe L=Lupnd
Relinquished By/Removed From	Date/Tune	Received By/Sto	red In Da	te/Time									X=Other
Relinquished By/Removed From	Date/Time	Received By/Sto	red la Da	de/Time									
LABORATORY Received B SECTION	у	<del></del>		331	tic .		<b>_</b> _				D	ate/Time	<u> </u>
FINAL SAMPLE Disposal M DISPOSITION	ethod		<del></del>			Dispo	sed By				ſ	Pete/Time	<del>,</del>
DIM F.C. 044 (00/00/00/00)				-				····				· · · · ·	

Appendix 5

**Data Validation Supporting Documentation** 

<u>V</u> ALIDATION LEVEL:	A	В	(c)	D	E
PROJECT:	100-13-2	٥	DATA PACKAG	E: K019	7
VALIDATOR:	TLE	LAB: LCI		DATE: 7/5	106
			SDG: 🞉	0197	
		ANALYSES	PERFORMED	·	
SW-846/ICB	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MAT	RIX				
31006	29 JIOV	70 (TIOV	rl Tiouz	7 Tlov7	3 711108
1. DATA PA	ACKAGE COMPL				Soil
Technical verificat		present?			Yes (No N/A
	MENT PERFORM		•	rels D and E)	Yes No N/A
Initial calibrations	acceptable?			***************************************	Yes No N/A
ICP interference ch	necks acceptable?	***************************************	***************************************		Yes No N/A
ICV and CCV chec	cks performed on al	l instruments?	******		Yes No N/A
ICV and CCV chec	cks acceptable?				Yes No N/A
Standards traceable	e?	********************		************	Yes No N/A
Standards expired?	)	***************************************		***************************************	Yes No N/A
Calculation check	acceptable?				Yes No V/A
Comments:		-			

3. BLANKS (Levels B, C, D, and E)	
ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	(Ye) No N/A
Field blank results acceptable? (Levels C, D, E)	Yes (Nd) N/A
Transcription/calculation errors? (Levels D, E)	Yes No (V/A)
Comments: MB 69 - Calcium + Silican - UJ	
Fral, burrow, Fe, majnesson, mangores, Na,	X1 nc
4. ACCURACY (Levels C, D, and E)  MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	
MS/MSD standards NIST traceable? (Levels D, E)	
MS/MSD standards expired? (Levels D, E)	
LCS/BSS samples analyzed?	
LCS/BSS results acceptable?	
Standards traceable? (Levels D, E)	
Standards expired? (Levels D, E)	
Transcription/calculation errors? (Levels D, E)	
Performance audit sample(s) analyzed?	
Performance audit sample results acceptable?	
Comments:	po PH
	<u> </u>

5. PRECISION (Levels C, D, and E)		
Duplicate RPD values acceptable?	Yes No	N/A
Duplicate results acceptable?	Yes No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes No	MA
Field duplicate RPD values acceptable?		N/A
Field split RPD values acceptable?	Yes No	M/A
Transcription/calculation errors? (Levels D, E)	Yes No	(A)
Comments:		
6. ICP QUALITY CONTROL (Levels D and E)		, <u> </u>
ICP serial dilution samples analyzed?	Yes No	N/A
ICP serial dilution %D values acceptable?	Yes No	N/A
ICP post digestion spike required?	Yes No	N/A
ICP post digestion spike values acceptable?	Yes No	N/A
Standards traceable?	Yes No	N/A
Standards expired?	Yes No	N/A
Transcription/calculation errors?	Yes No	N/4
Comments:	-	$\bigcup$
		-

7.	FURNACE AA QUALITY CONTROL (Levels D and E)		1	<i>_</i>
Dupl	licate injections performed as required?	Yes	No	N/A
Dupl	licate injection %RSD values acceptable?	Yes	No	N/A
Anal	ytical spikes performed as required?	Yes	No	N/A
Anal	lytical spike recoveries acceptable?	Yes	No	N/A
Stand	dards traceable?	Yes	No	N/A
Stand	dards expired?	Yes	Νo	N/A
MSA	A performed as required?	.,Yes	No	N/A
MSA	A results acceptable?	Yes	No	N/A
Trans	scription/calculation errors?	Yes	No	N/A
Com	ments:	·		
8.	HOLDING TIMES (all levels)	A		
	ples properly preserved?	1' Y		N/A
Sam	ple holding times acceptable?	Yes	No	N/A
Com	nments:			
		· · · · · · · · · · · · · · · · · · ·		
-			.—.	
	· · · · · · · · · · · · · · · · · · ·			
		· · · · · · · · · · · · · · · · · · ·		

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)	
Results reported for all requested analyses?	
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No NA
Detection limits meet RDL?	Yes N/A
Transcription/calculation errors? (Levels P, E)	Y& No WA
Samples properly prepared? (Levels D, E)  Detection limits meet RDL?  Transcription/calculation errors? (Levels D, E)  Comments:	
	<u>-</u>

er er i fill frem mennt den fillstatik a**lleda blik stektive** grove, kann blifte og en er i stektiver.

# Appendix 6

Additional Documentation Requested by Client

# INORGANICS METHOD BLANK DATA SUMMARY PAGE 02/01/06

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

NORK	ORDER:	11343-606-001-9999-00	

					REPORTING	dirution
GAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
E752##=				====×*		
BLANK1	06L0059~NB1	Silver, Total	0.14 u	NG/KG	0.14	1.0
	•	Aluminum, Total	3.0 u	MG/KG	3.0	1.0
		Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Boron, Total	0.27 u	MG/KG	0.27	1.0
		Barium, Total	0.05	M@/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1,0
		Calcium, Total	40.1	MG/KG	2,0	1.0
		Cadmium, Total	0.49 u	NG/KG	0.49	1.0
		Cobalt, Total	0.12 u	MG/KG	0.12	1.0
		Chromium, Total	0.52 u	NG/KG	0.52	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		fron, Total	2.5	MG/KG	0.99	1.0
		Potassium, Total	54.0 บ	NG/KG	54.0	1.0
		Magnesium, Total	1.4 u	MG/KG	1.4	1.0
		Manganese, Total	0.53 u	MG/KG	0.53	1.0
		Molybdenum, Total	0.13 u	MG/KG	0.13	1.0
		Sodium, Total	2.8 u	MG/KG	2.8	1.0
		Nickel, Total	1.3 ນ	NG/KG	1.3	1.0
		Lead, Total	2.8 u	MG/KG	2.9	.1.0
		Antimony, Total	0.40 u	MG/KG	0.40	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
		Silicon, Total	6.3	MG/KG	0.82	1.0
		Vanadium, Total	0,09. u	MG/KG	0.09	1.0
		Zinc, Total	0.05 u	MG/KG	0.05	1.0
BLANK1	06C0016-MB1	Nercury, Total	0.02 u	MG/KG	0.02	1.0

# INORGANICS ACCURACY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9995-00 LVL LOT #: 0601L140

			SPIKED	INITIAL	SPIK2D		DILUTION
SAMPLE	SITE ID	ANALYTE	Sample	RESULT	AMOUNT	*RECOV ·	FACTOR (SPK)
******	*************************************	************		******			******
-002	J10V70	Silver, Total	4.8	0.14u	5.1	94.1	1.0
		Aluminum, Total	4820	4580	206	118.9*	1.0
		Arsenic, Total	196	1.5	206	94.6	1.0
		Boron, Total	96.2	1.8	103	91.8	1.0
		Barium, Total	258	52.0	206	100.3	1.0
		Beryllium, Total	5.0	0.24	5.1	93.4	1.0
		Calcium, Total	5920	3840	2570	81.1	1.0
		Cadmium, Total	4.2	0.50u	5.1	82.4	1.0
		Cobalt, Total	60.2	10.7	51.4	96.3	1.0
		Chromium, Total	23.8	5.3	20.6	89.8	1.0
		Copper, Total	40.7	15.5	25.7	98.1	1.0
		Iron, Total	18400	20000	103	-1600. +	1.0
		Potessium, Total	3000	758	2570	87.1	1.0
		Magnesium, Total	6170	3740	2570	94.7	1.0
	•	Manganese, Total	334	287	51.4	92.6*	1.0
		Molybdenum, Total	99.1	0.58	103	95.8	1.0
		Sodium, Total	2340	121	2570	86.4	1.0
		Nickel, Total	48.0	7.9	51.4	78.0	1.0
	•	Lead, Total	61.8	15.5	51.4	90.1	1.0
		Antimony, Total	36.7	0.41u	51.4	71.4	1.0
		Selenium, Total	186	0.37u	206	90.4	1.0
		Silicon, Total	812	511	103	292.8*	1.0
	•	Vanadium, Total	91.7	53.9	51.4	73.5	1.0
	•	Zinc. Total	112	62.3	51.4	96.1	1.0

#### INORGANICS ACCURACY REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

WORK ORDER: 11343-606-001-9999-00

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	Sample	RESULT	ANOUNT	*RECOV	Pactor (SPK)
				*=====	****	*******	********
-006	J11108	Mercury, Total	0.56	0.33	0.17	142.5	1.0

### INORGANICS PRECISION REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

			INITIAL			DILUTION
SAMPLE	SITE ID .	ANALYTE	RESULT	REPLICATE	RPD	PACTOR (REP)
		<b>自己的现在分词 化基础 化二氯甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基</b>	******		#	*****
-002REP	J10V70	Silver, Total	0.14u	0.144	ИС	1.0
		Aluminum, Total	4580	4930	7.3	1.0
		Arsenic, Total	1.5	2.0	28.6	1.0
		Boron, Total	1.8	1.5	16.2	1.0
		Barium, Total	52.0	65.0	22.2	1.0
		Beryllium, Total	0.24	0.22	7.2	1.0
		Calcium, Total	3840	4260	10.3	1.0
		Codmium, Total	0.58u	0.50u	NC	1.0
		Cobalt, Total	10.7	13.0	19.4	1.0
		Chromium, Total	5.3	6.8	24.8	1.0
		Copper, Total	15.5	19.0	20.3	1.0
	•	Iron, Total	20000	21900	8.7	1.0
		Potassium, Total	758	767	1.2	1.0
		Magnesium, Total	3740	4210	11.9	1.0
	,	Manganese, Total	287	330	14.1	1.0
		Molybdenum, Total	0.58	0.61	5.5	1.0
		Sodium, Total	121	117	3.4	1.0
		Nickel, Total	7.9	8.5	7.3	1.0
		Lead, Total	15.5	21.1	30.6.	1.0
		Antimony, Total	0.41u	0.54	Vc 300	1.0
		Selenium, Total	0.37u	0.42	W 300 1-120	1.0
		Silicon, Total	511	544	6.2 My 3/1/20	1.0
		Vanadium, Total	53.9	52.2	3.2	1.0

1.0

### INORGANICS PRECISION REPORT 02/01/05

CLIENT: TNUHANFORD RC-020 K0197

LVL LOT #: 0601L140

WORK ORDER: 11343-606-001-9999-00

			INITIAL		DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE RPD	Pactor (RBP)
****		<b>被禁机的 医耳氏性 医甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基</b>		化多型银色中央共和 电水平电流流	2024年本学年中共1020年
-006REP	J11108	Mercury, Total	0.33	0.36 10.4	1.0

### INORGANICS LABORATORY CONTROL STANDARDS REPORT 02/01/06

CLIENT: TNUHANFORD RC-020 K0197 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0601L140

			SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	SAMPLE	AMOUNT	UNITS	*RECOV
			*****	名が中央中央	***	****
LCS1	Q6L0059-LC1	Silver, LCS	50.8	50.0	MG/KG	101.6
		Aluminum, LCS	469	500	MG/KG	93.8
		Arcenic, LCS	990	1000	MG/KG	99.0
		Boron, LCS	496	500	NG/KG	99.1
		Barium, LCS	507	500	MG/KG	101.4
		Beryllium, LCS	23.9	25.0	MG/KG	95.6
		Calcium, LCS	2310	2500	MG/KG	92.2
	•	Cadmium, LCS	21.6	25.0	MG/KG	86.4
		Cobalt, LCS	255	250	MG/KG	102.0
		Chromium, LCS	46.3	50.0	MG/KG	92.6
		Copper, LCS	132	125	MG/KG	105.6
		Iron, LCS	470	500	MG/KG	93.9
		Potassium, LCS	2270	2500	MG/KG	90.8
		Magnesium, LCS	2480	2500	MG/KG	99.3
		Manganese, LCS	68.8	75.0	MG/KG	91.7
	•	Molybdenum, LCS	532	500	MG/KG	106.5
		Sodium, LCS	2250	2500	MG/KG	90.1
	,	Nickel, LCS	181	200	MG/KG	90.5
		Lead, LCS	223	250	MG/KG	89.0
		Antimony, LCS	306	300	MG/KG	102.0
	•	Selenium, LCS	950	1000	MG/KG	95.0
		Silicon, LCS	388	500	MG/KG	77.6
		Vanadium, LCS	254	250	MG/KG	101.6
		Zinc, LCS	102	100	мв/кв	102.5
LCS1	06C0016-LC1	Mercury, LCS	6.6	6.2	MG/KG	105.9